1501 Vol. XLVII MAY 31st, 1945

LIBRARY

FLIGHT

and

AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB ONE SHILLING

RAF MED JUL 2 1945 H.Q. REF. LIBRARY

TITANINE
AIRCRAFT FINISHES
ANINE LIMITED COLINDALE LONDON N.W.9 TELEPHONE COLINDALE 812
NSEES IN CANADA: INTERNATIONAL PAINTS (CANADA) LTD., 6700, PARK AVENUE, MONTREA

HERCULES

Parade of Britain's air power

No 10... **Saro "Lerwick"**

The Saunders-Roe LERWICK is a twin-engine general purposes flying-boat used operationally during the earlier days of the war, and later used to great advantage as a trainer for flying-boat crews. This war-time successor of a long line of famous "SARO" flying-boats is powered by two "Bristol" Hercules Sleeve-valve engines. The success of the sleeve-valve engine in this and many other flying-boats of the past, points to the single sleeve-valve as being the ideal power principle for the civil flying-boat of the future.

"Bristol"

The single sleeve-valve principle was pioneered & developed by "Bristol"

THE BRISTOL AEROPLANE COMPANY LIMITED

FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor
C. M. POULSEN

Managing Editor
G. GEOFFREY SMITH, M.B.E.

War Correspondent
JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.
BIRMINGHAM, 2: GUILDHALL BUILDINGS, NAVIGATION ST. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).
MANCHESTER, 3: 260, DEANSGATE. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

Registered at the G.P.O. as a Newspaper.

No. 1901. Vol. XLVII. May 31st, 1945 Thursdays, One Shilling.

The Outlook

Air Transport

TRANSPORT by air is dealt with in this issue from what may be regarded as opposite ends of the scale, but both emphasise the way in which the subject has assumed importance. On the one hand we have Sqn. Ldr. Charles Gardner stating, in connection with the work of the Combat Cargo Task Force in Burma, that "in time, in cost, in speed and in bulk, air supply came out on top." Usually one of these items, cost, is omitted from accounts of military operations. We are glad to see that our contributor introduces it; in the years to come there will without question be a greatly extended use of air transport of supplies and men for military and semi-military operations, when cost will certainly have to be considered in its relation to the value of the work being done. That much of such work will have to be in out-of-the-way places like Burma is to be expected, and it may well be that machines will have to be specially designed for operation from flight strips and similar makeshift ground facilities.

At the other end of the scale we have the new Handley Page Hermes freighter described in this issue. With its wing loading of 50 pounds per square foot, or more, it would scarcely be suitable for flight-strip operation, but what a boon it would have been to the Royal Air Force had it been in service during the Mediterranean campaign and the war on the West Front. Should the war with Japan drag on for much longer than now seems likely, this type would also be of great value for long-haul transport of men and material.

In the purely commercial field, for which it is primarily intended, the Hermes cargo version should form a very successful type as a complement to the passenger carrier which we described last October. Its efficiency is high, as emerges from the comparison made in this issue with the converted Halifax bomber. The figures show an almost startling difference, and bring out strongly the advantages of designing specifically for the particular class of work that has to be done. It is to be hoped that the Air Ministry will profit from the lesson and that it will not again be left behind in the transport class of aircraft.

The need for modern transport types is emphasised by the announcement that by the autumn R.A.F. Transport Command expects to fly 10,000 troops each way every month between this country and India. Dakotas are being used at first, but "Yorks and Liberators will come into operation later." When compared with the American effort in the Pacific, where 50 air transports are said to be in the air every minute of the day and night, and with America's use of air transport for bringing troops home from Europe, our shuttle service to India does not loom very large. A few score of aircraft specially designed for the work, had they been available, would have changed the picture considerably.

Man-power and Civil Aviation

AN article in this issue begins with the sentence "Things are moving fast in British civil aviation." That is true, but they could, and should, move even faster. We have many new types nearly finished or coming along, such as the Airspeed A.S.57, the Avro Tudor I and Tudor II, the Bristol Freighter and Brabazon I, the de Havilland Dove, the two versions of the Handley Page Hermes, the Short Shetland and the Vickers Viking. But progress might well be more rapid than it is.

The constructors are not to blame. They are struggling along as best they can with woefully inade-

quate staffs of technicians and draughtsmen. It might have been thought that the Ministry of Aircraft Production would by now be in a position to release considerable numbers of men for whose services it has been competing with the aircraft industry. Not only so, but the Air Registration Board, whose task it is to frame airworthiness certificate requirements for all British civil aircraft had men taken away early in the war and cannot now get them back, let alone getting additional staff.

When war broke out there was some excuse for M.A.P. grabbing all the men it could get. An almost fantastically large production job had to be tackled, and we do not forget the debt the nation owes to M.A.P. for the work it has done. But the picture is very different now, with the war in Europe ended, and it might have been thought that the Ministry was willing to cut down on its man-power requirements. So far from this being the case, M.A.P. is actually advertising for technicians (even in *Flight!*). It is a little difficult to see what excuse there can be for this. Millbank is already overpopulated, and if one man out of every three were transferred to the industry, it could make little difference to the war effort.

The New Brooms

MR. CHURCHILL, when forming his "caretaker" Government, appears to have followed the policy of leaving all Conservative Ministers who had been doing well in their offices. The only major changes are where Labour or Liberal Ministers gave up their portfolios.

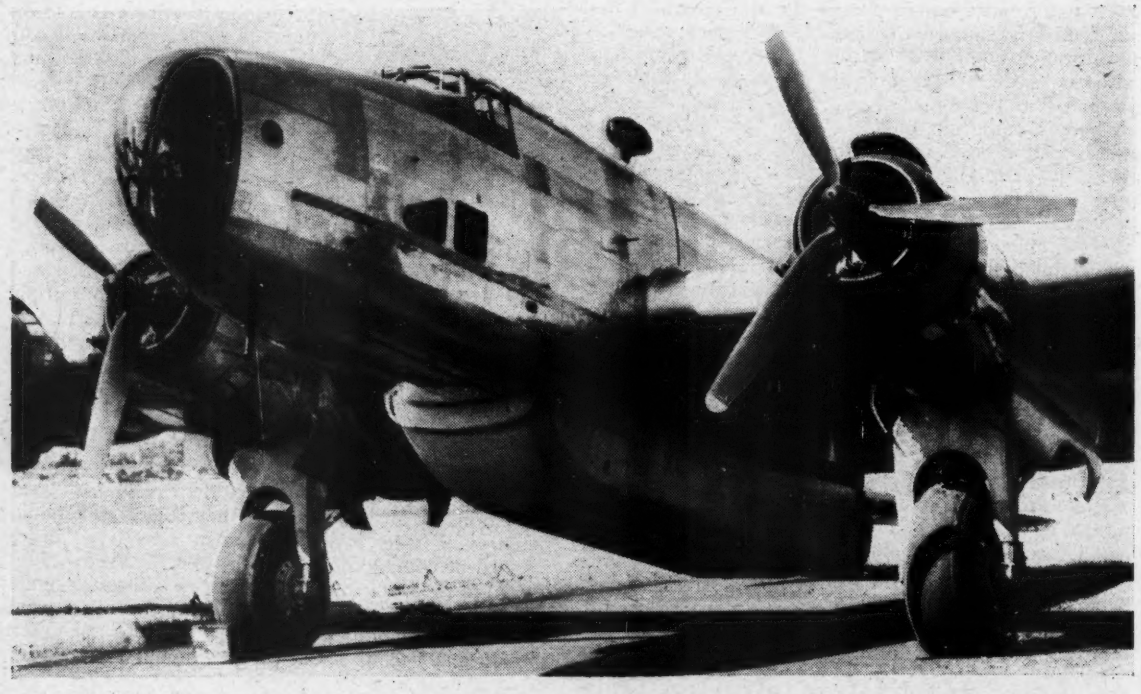
To the readers of *Flight* the most important change is that of the Air Minister. Sir Archibald Sinclair goes, and Mr. Harold Macmillan steps into his place. As leader of the Liberal Party, Sir Archibald had to have an important place in the Coalition Government. In his work at the Air Ministry it is impossible to say that he has done any harm, and it is equally impossible to say that he has done any good.

His successor, Mr. Macmillan, comes from the Middle East and the Mediterranean. Sir Frederick Sykes once called Cairo the "Clapham Junction of the air," and there Mr. Macmillan must have seen and been impressed by much air activity. We are not aware that he has any personal knowledge of the subject; but it is always unusual to entrust a Fighting Service to an expert, even if one could be found. Each new Air Minister has had to learn after he has settled in the saddle. It is unusual to see as the new joint Under-Secretary Commander Lord Beatty, an ex-naval officer.

The Fleet Air Arm, as part of the Navy, becomes the care of Mr. Brendan Bracken, a man of undoubted ability and wide information. Mr. Ernest Brown, as Minister of Aircraft Production, also inspires confidence. The Ministry of Civil Aviation remains as before in the hands of Lord Swinton.

CONTENTS

The Outlook	571
War in the Air	573
Here and There	575
Handley Page Civil Programme	577
The I.C.A.N. Conference	581
Coastal Command at Gibraltar	582, a
World Weather	582, b
Lessons of the Air War	584
Halton's Jubilee	587
Combat Cargo Task Force	588
Correspondence	591
Service Aviation	592



THE CONVERT: Externally the 11-passenger civil version of the Handley Page Halifax differs from the bomber mainly in the "pannier" for freight and luggage carried under the fuselage in place of the bomb bay. A description of this machine and of the new Hermes freight carrier will be found on pages 577–580.

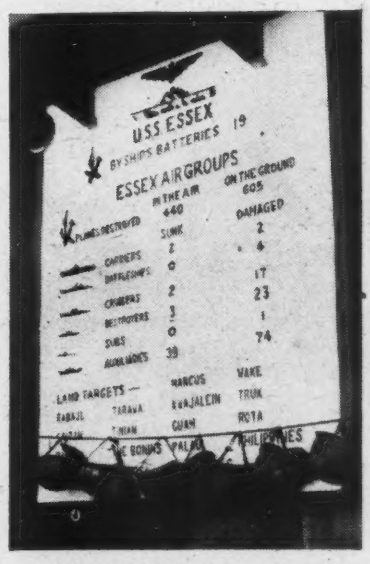
OVER THE HUMP: The mountainous terrain flown over by R.A.F. Dakotas on the air transport service between India and China.

WAR in the AIR

Second T.A.F. Praised by P.M. : How Air Transport Saved Chungking

NOT long ago the Japanese published news of a glorious victory over a British naval force in the Straits of Malacca. The British Admiralty, as is its way, waited until reliable reports came in and then published the true story. On May 6th an Avenger dive bomber from the escort carrier H.M.S. *Shah* spotted an enemy 10,000-ton cruiser with 8-inch guns, of the *Nati* class, with one destroyer in attendance, while not far off were a supply ship and a submarine chaser. The Avenger went for the cruiser with its bombs, probably scored one hit and also observed a near miss. It summoned a force of five destroyers, which attacked the cruiser with torpedoes in the night and sank her.

Another remarkable story of air transport in Burma has recently been made public, though it describes events in last December. A Japanese Army was threatening Chungking and Kunming, as well as the eastern terminus of the air and land routes between China and India. Reinforcements for China were urgently needed, and it was decided to despatch two divisions of the 6th Chinese Army, which were driving the Japanese southward from Myitkyina. In accordance with the practice of Eastern Air Command, the move was made by air. In about a month over 25,000 soldiers and 1,500 pack animals, in addition to numbers of jeeps, howitzers and mortars, were flown into China. This great effort involved over 1,500 aircraft sorties. The sudden arrival of these reinforcements must have been an unpleasant shock for the Japanese. Chungking did not fall.



NAVAL SCOREBOARD: The impressive list of kills and probables on U.S.S. Aircraft Carrier *Essex*.

It seems as if the Japanese have been stirred by the reports of the V-bombs and rockets lately used by the Germans, and wanted to do something of the same sort. The best they could do was to send uncontrolled balloons, made of paper, carrying small amounts of explosives, over parts of the United States and Canada. Up to the moment of writing these balloons have done no material damage, though they are capable of starting forest fires. One was shot down by a Canadian airman at a great height.

The Prime Minister has sent a message of congratulation to Air Marshal Sir Arthur Coningham on the work of the men of the 2nd Tactical Air Force, in which he said: "Their mastery of the skies above our armies, their ever vigilant reconnaissance, their intervention in the land battles, and their devastating attacks against the enemy's vital communications, concentrations, and supply organisation, have made the tasks of our armies far

WAR IN THE AIR

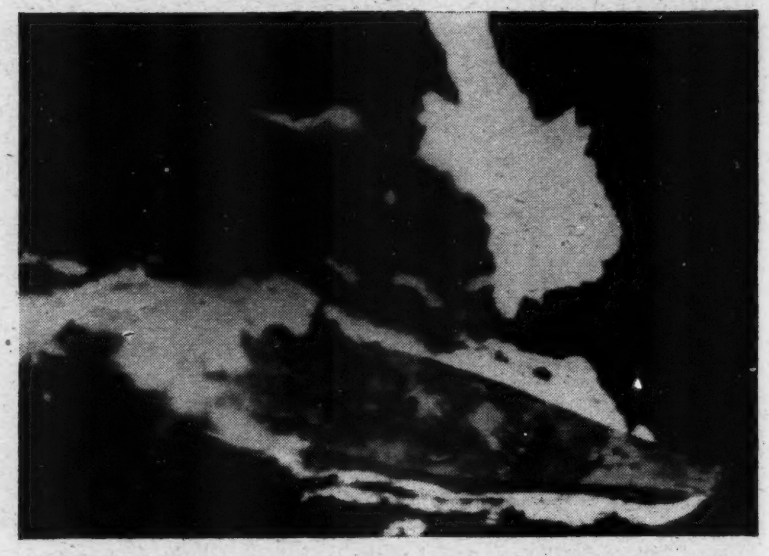
easier and far less costly in casualties." A Tactical Air Force could hardly ask for higher praise from a higher authority.

The Americans have continued to bombard Tokyo with Superfortresses, and have found fire-bombs most effective as agents of destruction. Last Saturday 500 of these machines were over the Japanese capital, and a strong gale fanned the fires which were started. It is reported that several square miles of the city were ravaged before the fires were brought under control. The Imperial Palace was damaged, and may have been destroyed, though this is not certain. One Japanese authority is said to have confessed that Tokyo was damaged beyond hope of restoration, and would have to be rebuilt from the ground up.

The British Pacific Fleet has continued to use the aircraft from its carriers against airfields and other targets on islands lying off Formosa.

Investigations in the "Bavarian Redoubt" have elicited a statement from a German scientist that early in January three U-boats sailed for Japan carrying two completed jet-propelled aircraft of the latest type, as well as turbine engines for rocket aircraft and a number of engineers. It seems rather late in the day for the Japanese, good copyists though they are, to start new factories to reproduce these presents.

Air transport to South-East Asia is now beginning to assume formidable dimensions. It is hoped that by the autumn 10,000 troops will be flown each way every month between Europe and S.E.A.C. Dakotas are being used at present. A new British bomber, known as the Lincoln, will probably be used in the Pacific war.



ANOTHER IN THE LOCKER: The Japanese battleship *Yamato* being attacked by U.S. naval aircraft south west of Kyushu. The *Yamato*, two cruisers and three destroyers were sunk in the action.

LANCASTER'S POLAR FLIGHTS

WITH the arrival back at its Shropshire base at 2.43 p.m. last Saturday, the R.A.F. Lancaster, *Aries*, completed a unique mission for the Empire Air Navigation School of Flying Training Command in a series of flights over the geographical and magnetic North Poles.

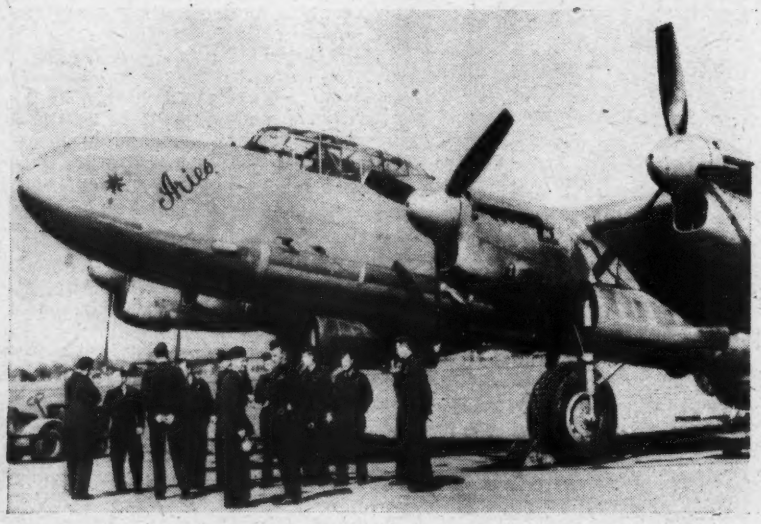
An important discovery was the locating of the Magnetic North Pole in the Sverdrup Islands, between 200 and 300 miles N.N.W. of its previously supposed position and within about 75 miles of the Astronomer Royal's estimate. It is 1,500 miles from the Geographical North Pole, and was located at 1 a.m. G.M.T. during the homeward flight from White Horse, Yukon, a 4,170 miles "hop" covered in 18 hr. 27 min. Altogether *Aries* covered 17,720 miles on the expedition and landed back at base within 1 min. of her E.T.A.

As reported in last week's issue (May 24th) of *Flight*, the *Aries* began its mission by a flight from Shawbury to Iceland, where final preparations for the actual polar trips were completed. Then, at 5.23 p.m. (D.B.S.T.) on Wednesday, May 16th, her pilot, Wing Cdr. D. C. McKinley, D.F.C., A.F.C., took *Aries* off from her Icelandic airfield, flew over the Geographical North Pole, and returned to the same airfield, landing at six minutes after noon the following day. It is calculated that they were over the Pole at approximately 3 a.m.

On Friday, May 18th, *Aries* again set out from Iceland for the Magnetic North Pole, it being the intention of McKinley to fly on from the Pole to Dorval, Montreal. But electrical difficulties arose, and he decided to land at Goose Bay.

By afternoon on the next day, however, the Lancaster was able to take off again from Goose Bay airfield and fly to Dorval, where she landed at ten minutes past noon on Sunday, May 20th. From there she flew to White Horse.

Senior navigator of the crew of the *Aries* was Wing Cdr. W. E. Anderson, O.B.E., D.F.C., and he was assisted by Flt. Lt. S. T. Underwood.



POLAR CREW: The crew of the *Aries*, with Wing Cdr. McKinley, hand on hip, in the centre, snapped with their specially equipped Lancaster at Shawbury (Salop) just before the start of the expedition.

HERE AND THERE

VISITORS' DAY: Fleet Air Arm pilots, who recently visited an R.A.F. Hurricane T.R. squadron on the Burma front to gain a general idea of the situation, attending a briefing by an Army liaison officer.

New D.H. Engine Co. Chairman

MAJOR F. B. HALFORD has been elected chairman of the de Havilland Engine Co., Ltd., in place of Mr. W. E. Nixon, who has relinquished his seat on the board in order to devote all his time to his responsibilities as managing director of the de Havilland Aircraft Co., Ltd. Mr. A. S. Butler, chairman of the latter company, has also joined the engine company's board.

New Super Fuel

VICTANE is the name of a new special fuel developed by Imperial Chemical Industries at their Billingham plant which, Lord McGowan announces, "gives the engines of fighter aircraft up to 25 per cent. more power than any previous aviation fuel."

Since 100-octane spirit has been in use for a long time past, this development in still higher-grade fuels, which *The Autocar* has previously referred to, is of more than ordinary interest. Manufacturers of Victane began in 1944, and full information was immediately passed on to our American allies.

Lord McGowan, chairman of I.C.I., stated that in the search for more power from existing engines a particular organic chemical was found which had these properties, and a practical process of manufacture was quickly worked out and the fuel produced in time for D-Day.

Sir Roy Dobson's Guests

THE French Air Mission which has been touring round the British aircraft industry (its arrival and purpose were reported in *Flight* at the time) to study British manufacturing methods and to explore the possibilities of manufacturing British aircraft, engines and equipment in France, recently paid a visit to the Avro factories at Manchester and were entertained by Sir Roy Dobson, managing director of A. V. Roe and Co., Ltd.

Sir Roy personally conducted the visitors round the Chadderton factory, and they later went on to the firm's assembly unit at Ringway, where they also enjoyed a short flight in a bomber.

In addition to seeing the production lines of Lancasters and Yorks, the French visitors, headed by Gen. Henri Ziegler, also learnt something of the forthcoming Tudor.

MISSION TO MANCHESTER: Members of the French Air Mission to Britain (see adjoining paragraph) snapped at Ringway during their visit to the Avro plant. Left to right are: Maj. A. Esperet, Col. C. Rozanoff, Wing Cdr. Francis (their escorting officer), Sir Roy Dobson, Gen. H. Ziegler, Mr. C. E. Fielding, Maj. C. Teyssier, and Mr. A Sewart. The aircraft is, of course, a York.

Now It Can be Told

THAT the Germans could easily have outwitted Radar, had they only known how simply this could have been done, and thus probably have won the Battle of Britain, was disclosed by Wing Cdr. Ronald Adams, a fighter controller at Hornchurch, when he told the inside story of the Battle of Britain in a B.B.C. broadcast last week.

Those who heard this broadcast will agree it was a thrilling story well told.

"Radar was in its infancy in those days," said the Wing Commander, "It was not at all accurate, and there were times when it could fail to give any information at all."

Lindbergh for Europe?

THE United Aircraft Corporation, U.S., announced recently that it proposes to send ex-Colonel Charles A. Lindbergh to Europe to continue the studies he conducted last year in the Pacific area in connection with the corporation's activities in the development and production of aircraft engines and airscrews for the armed services.

Col. Lindbergh, first man to fly the Atlantic solo (1927), last visited Europe in 1938 when he spent some time in Germany and was decorated by the Nazi Government. In 1941 he resigned his

HERE AND THERE

commission in the U.S. Air Corps Reserve after Mr. Roosevelt had attacked him as an "appeaser."

One cannot imagine that, in the circumstances, Lindbergh will be a particularly welcome visitor to Europe just now.

"Southern Cross" Flies Again

AS mentioned some little time ago in *Flight*, the late Sir Charles Kingsford-Smith's famous Fokker monoplane, *Southern Cross*, was to be made ready to fly again in order to take part in the film "Smithy," being produced by Columbia Pictures in Australia.

Last week it made a short test flight at Canberra, after being overhauled by the R.A.A.F., and, having been granted a Certificate of Airworthiness, was then flown from Canberra to Sydney.

Wing Cdr. John Kingsford-Smith, nephew of "Smithy," was a member of its crew, and the trip was covered at an average speed of 105 m.p.h.

Distinguished Visitor

SENOR JOSE MARIA PENA, Director-General of Civil Aviation for Uruguay, who is at present in this country, recently paid a visit to the Bermondsey A.T.C. Wing H.Q., accompanied by Group Capt. Sidney Smith, London Command Commandant.

He saw cadets busy at their normal routine and was visibly impressed with the Corps' efficient training methods, and the fact that the end of the war in Europe had in no way lessened their activities.

R.C.A.F. Occupation Force

THE Canadian Government is to retain operational squadrons of the R.C.A.F. in Britain "until conditions in Europe justify its withdrawal," according to an official statement issued in London last week. The purpose is to assist in holding Germany to the terms of her unconditional surrender.

Personnel who elect to serve in the Pacific theatre against the Japanese will have priority in home leave, and those electing to serve in the occupational force in Europe will be sent on leave to Canada as soon as facilities permit. Reinforcements for both overseas forces are to be trained.

Jet Progress

ACCORDING to Hall L. Hibbard in an interview with *American Aviation*, the U.S. is far out in front of the world in jet development. "The Americans are far in the lead in jet propulsion," he said. "We know that the present General Electric jet engine used in the *Shooting Star* is the most powerful aircraft engine ever built. It is far superior to the present British jet engines. And we know that the *Shooting Star* is faster and has several times the range of the German jet planes."

Mr. Hibbard can possibly be forgiven for his claims in the relative position of jet-propelled aircraft in Britain and America because this country has been silent about its recent achievements, but it can be taken as definite that we are not lagging behind—indeed, the engine of the *Shooting Star* was based upon British basic patents.

RADIO TARGET TUG: A radio-controlled target tug, used by the American Army for A.A. practice shoots, on its mobile catapult. Power is apparently supplied by a small flat-twin two-stroke driving a pair of two-bladed, fixed-pitch contra-props.

News in Brief

AIR VICE-MARSHAL J. O. ANDREWS, appointed Air Officer in Charge of Administration, Flying Training Command, in 1943, has retired.

* * *

The engagement was announced last week between Patricia, younger daughter of Sir Alliott and Lady Verdon-Roe, and Sqn. Ldr. Maurice W. Hartford, D.F.C.

* * *

Lt. (A.) Brian Aikens, R.N.V.R., of Ealing, London, has been awarded the American D.F.C. "for great gallantry and devotion to duty" while on loan to the U.S.A.A.F. as a naval observer.

* * *

A recent Superfortress incendiary raid on Nagoya left the entire southern part of the Jap city, including the Mitsubishi factory (their biggest aircraft plant) in flames, it was reported by returning bomber crews.

* * *

Some 75 Flying Fortresses and Liberators which made forced landings in Sweden during the war against Germany will soon return to America. Before crossing the Atlantic they will be completely overhauled by the U.S.A.A.F. in Britain.

* * *

Promotion to the acting rank of Air Marshal of Air Vice-Marshal Sir Hugh P. Lloyd, who commanded the R.A.F. in Malta during the heaviest air attacks, has been announced in *The London Gazette*. Air Comdre. R. L. Ragg and Group Capt. (Act. Air Comdre.) I. E. Brodie are promoted Acting Air Vice-Marshals.

* * *

The Air Minister has received from M. F. T. Gousev, the Soviet Ambassador, a message congratulating the R.A.F. and hoping that the wartime friendly co-operation between Britain and the U.S.S.R. would continue and develop in peacetime. Sir Archibald Sinclair, in his reply, said he fully shared this hope and thought the mutual respect between our respective Air Forces would be a strong element in realising it.

Air Chief Marshal Sir Arthur Harris, C.-in-C. Bomber Command, has sent messages of congratulations to the Air Forces of Canada, Australia, New Zealand, South Africa and Southern Rhodesia.

* * *

Admiral Teijiro Toyada, Japanese Munitions Minister, in an address to Japanese munitions chiefs, urged them to concentrate on aircraft production and take steps for the speedy dispersal of big aircraft factories to country districts.

* * *

Navy Avengers and Helldivers last week carried out the first bombing attack on the new Kumamoto aircraft assembly plant in central Kyushu, the southernmost island of Japan. The plant was reported heavily damaged, and 62 Jap aircraft were shot down.

* * *

The Russian Air Force, says a Reuter message from Moscow, flew 17,500 sorties on the first day of the Berlin offensive. April, the last month of the war, saw their most intensive activity with 216,000 sorties flown and 45,000 tons of bombs dropped. During nearly four years of combat Soviet airmen have flown a total of more than 3,000,000 sorties.

* * *

Wing Commander D. E. Kingaby, D.S.O., D.F.M. and two bars, who, states *The London Gazette*, has been awarded the American D.F.C. for valuable services, was known in the Battle of Britain as "the Messerschmitt 109 specialist." He destroyed more Me109 fighters than any other R.A.F. pilot, his record up to the middle of June last year being 27½.

* * *

When the *Luftwaffe* general, Maj. Gen. Ulrich Kessler, went ashore from the German submarine, U.234, at Portsmouth, New Hampshire, last week, journalists were ordered to keep at least 8ft. away from him. The U.234 surrendered off Newfoundland, and Kessler is to be "subjected to rigorous questioning," according to a Reuter message.

Handley Page Civil Programme

Most prominent feature of the civil Halifax (above) is the "pannier" in place of the bomb bay. Below is an artist's impression of the Hermes cargo version being loaded.

Converted Halifax Bomber Ready to Fill the Interim Period : A Cargo Version of the Hermes Passenger Carrier

THINGS are moving fast in British civil aviation in spite of the uncertainty caused by the fact that the White Paper is still waiting to be "implemented" and the imminence of the general election may cause a complete change of Government policy. Recent civil types announced and described in this journal are the de Havilland Dove, the Short Shetland flying boat, and the Vickers Viking, while some months ago (October 19th, 1944) we described and illustrated the Handley Page Hermes passenger carrier.

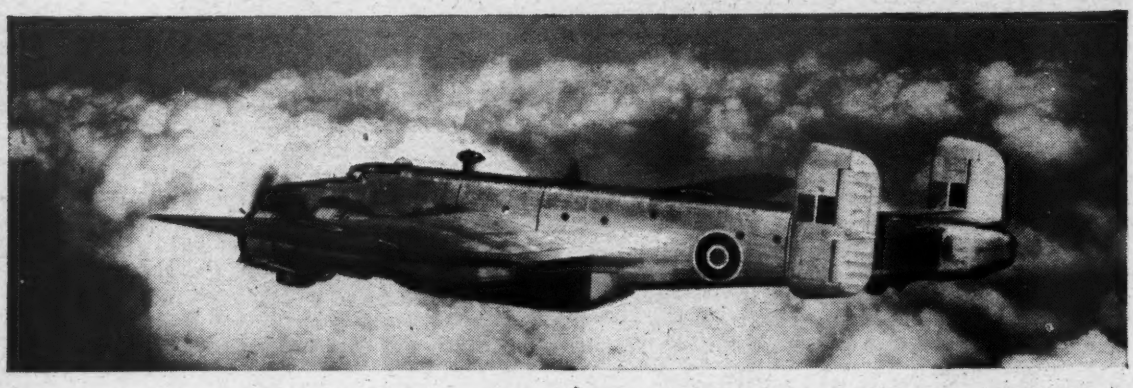
The Handley Page company now announces two more civil types: a passenger conversion of the Halifax bomber and a freight version of the Hermes. Both are powered by four Bristol Hercules engines (not identical versions, however), each giving more than 1,650 h.p. for take-off, so that an interesting comparison can be made between the converted bomber and the out-and-out civil type. The former has a normal gross weight of 65,000 lb., while the latter weighs 75,000 lb. loaded. The Halifax has a wing area of 1,275 sq. ft.; that of the Hermes is 1,408 sq. ft. Thus the two wing loadings are 51 lb./sq. ft. and 53 lb./sq. ft. respectively. The corresponding power loadings (based on 1,650 h.p. per engine for take-off) are 9.85 lb./h.p. and 11.35 lb./h.p. respectively. The combined loadings (wing loadings multiplied by power loadings) are 500 and 600 respectively. Dr. Edward P. Warner has laid it down that for maximum economy the combined loading should be about 300, so both these Handley Page types exceed this figure by a considerable amount, the Hermes by 100 per cent.

Cruising Speed and Consumption

An interesting sidelight is thrown on aircraft design by the fact that in spite of its higher combined loading, the Hermes cruises at a most economical cruising speed of 194 m.p.h., while the corresponding figure for the Halifax is 210 m.p.h. at 15,000ft. and 200 m.p.h. at 10,000ft., not a very great difference. The larger machine, therefore, must be proportionately "cleaner." This is brought out much more strikingly by the consumption figures.

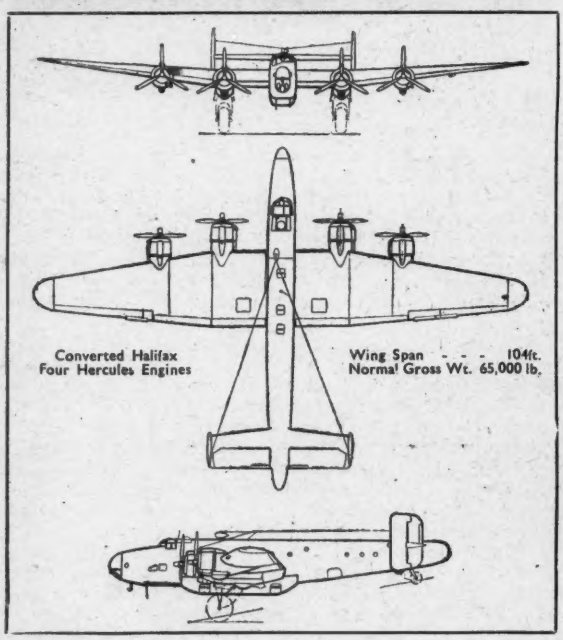
The makers have not provided figures of miles per gallon, but these can be calculated from the data given in the tables. Maximum range for the Halifax on normal tankage is 2,530 miles, the tankage being 2,190 gallons. This, there-

HANDLEY PAGE CIVIL PROGRAMME



Unturreted. The civil version of the Halifax (above) has a maximum level speed of 320 m.p.h.

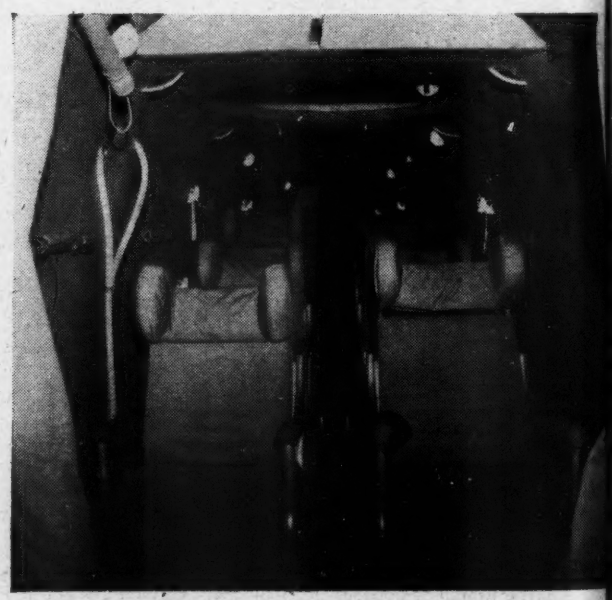
Two of the eleven passengers of the Halifax have seats convertible into berths (below).



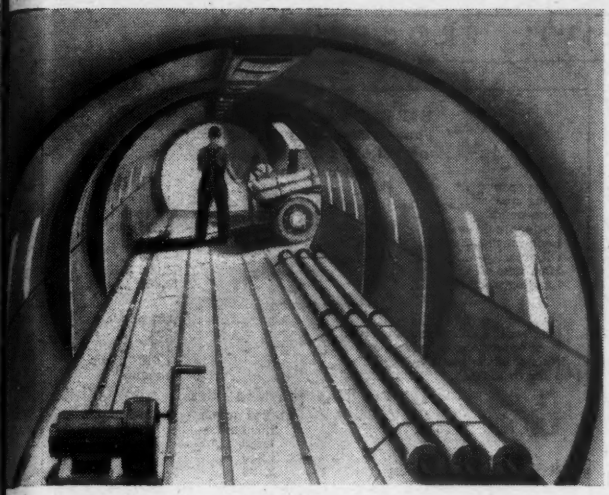
fore, represents an average fuel consumption of 1.156 miles per gallon. The corresponding figure for the Hermes is 1.175 miles per gallon or, for all practical purposes, the same consumption, although the Hermes is a much larger and heavier machine. In other words, the type designed initially for commercial work is a good deal more efficient, aerodynamically, than the converted bomber.

Ranges and Payloads

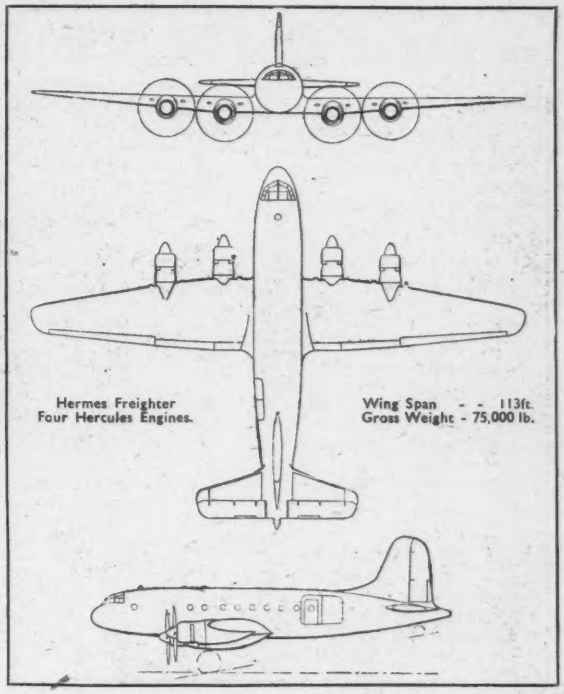
Even this figure does not convey the vast difference in commercial efficiency of the two types. The pay load is the item most closely concerned. It is illuminating to find, on examining the two tables of data, that the civil Halifax at 2,530 miles' range carries a payload of 7,750 lb., whereas the Hermes carries a payload of 13,000 lb. over a range of 2,600 miles. That difference illustrates clearly the greater efficiency of the civil type. The engines in the two types are not identical, but their differences are not sufficient to account for the remarkable advantage of the Hermes



Elbowroom is not plentiful inside the civil Halifax, and it would appear that passengers will have to walk sideways along the gangway.



Spaciousness inside the Hermes. Transport of fire-fighting equipment might well be one of the functions of this machine.



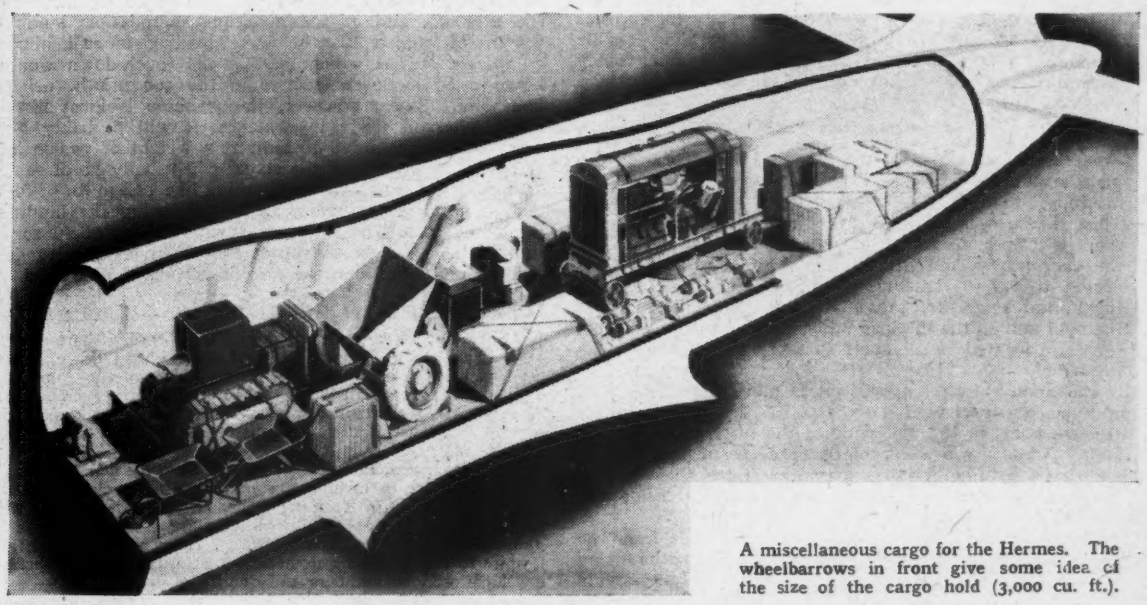
from an economy point of view. First cost will, of course, enter into the calculations to a marked extent, but the Halifax would have to be very cheap indeed to compete over a period of several years with the Hermes.

Of course, the comparison is not quite fair because the Halifax is a bomber converted into a passenger carrier while the Hermes is a freighter. The table shows, however, that of the basic equipped weight of the Halifax of 40,600 lb., 2,850 lb. is accounted for by crew and removable equipment. Thus, leaving the odd 850 lb. for the crew, there is only 2,000 lb. to be transferred to the payload side of the ledger. In the figures quoted above, this would mean increasing the payload of the Halifax from 7,750 lb. to 9,750 lb., still a long way below the freight load, for the same range, of the Hermes.

On the principle that half a loaf is better than no bread, the Halifax may well fill what would otherwise have been an awkward gap. It is available almost at once, and there should be no difficulty about spares. So let us see what it has to offer. The space in the fuselage has been furnished to accommodate 11 passengers. Nine of them are provided with armchair seats while, as the makers' description somewhat frankly states, the other two are accommodated "in a comfortable compartment that is readily convertible into sleeping berths." The tacit admission that the other nine are not very comfortable is borne out by the photograph, which shows a very narrow gangway between the rows of seats. However, the Halifax is intended to serve during a period when speed of travel over long distances may be deemed more important than luxurious comfort.

Halifax Cargo Capacity

The most ingenious feature of the converted Halifax is the cargo "pannier" slung under the portion of the fuselage where is the bomb bay in the military machine.



A miscellaneous cargo for the Hermes. The wheelbarrows in front give some idea of the size of the cargo hold (3,000 cu. ft.).

HANDLEY PAGE CIVIL PROGRAMME

HALIFAX TRANSPORT
Four Bristol Hercules Engines

General Data

Wing span	104 ft. 0 in.
Wing area	1,275 sq. ft.
Tare weight	37,750 lb.
Removable equipment and crew	2,850 lb.
Fuel (normal tanks)	2,190 Imp. gals.
Fuel (long-range tanks)	2,880 "
Oil	128 gals.
Basic equipped weight	40,600 lb.
Engines	4 Bristol Hercules of 1,650 h.p.
Airscrews	de Havilland Hydromatic three-bladers, fully feathering.

Performance

Max. level speed	320 m.p.h.
Max. weak-mixture cruising at 10,000ft.	260 "
" " " " 15,000ft.	270 "
Economical cruising speed at 10,000ft.	200 "
" " " " 15,000ft.	210 "

Range and Load

At 65,000 lb. gross weight (landing weight, 55,000 lb.):

Max load	12,100 lb.
Range with max. load	1,810 miles
Range with 10 000 lb. load	2,150 "
Max. range (normal tanks)	2,530 "
Load for max. range (normal tanks)	7,750 lb.
Max. range (long-range tanks)	3,510 miles
Load for max. range (long-range tanks)	2,500 lb.

At 68 000 lb. gross weight (landing weight, 57,000 lb.):

Max. load	14,100 lb.
Range with max. load	1,380 miles
Range with 12,500 lb. load	2,120 "
Max. range (normal tanks)	2,420 "
Load for max. range (normal tanks)	10,750 lb.
Max. range (long-range tanks)	3,380 miles
Load for max. range (long-range tanks)	5,450 lb.

HERMES CARGO CARRIER
Four Bristol Hercules Engines
(over 1,650 h.p. for take-off)

General Data

Wing span	113 ft. 0 in.
Wing area	1,408 sq. ft.
Bare weight	37,642 lb.
Normal fuel capacity	2,574 gals.
Long-range capacity	2,874 "
Oil capacity	120 "
Max. take-off weight	75,000 lb.
Landing weight	70,000 "

Performance

Max. level speed	337 m.p.h.
Max. weak-mixture cruising speed	284 "
Most economical cruising speed	194 "
Rate of climb (sea level)	1,010 ft./min.
Time to 10,000ft.	10 mins.

Range and Payload

	At 240 m.p.h.	At 194 m.p.h.
Range with 18,000 lb. load	1,600 miles	1,745 miles
" " 16,000 lb. "	1,880 "	2,060 "
" " 13,000 lb. "	2,340 "	2,600 "
Max. range (normal tanks)	2,700 "	3,030 "
Corresponding load	10,720 lb.	10,720 lb.
Max. range (long-range tanks)	3,040 miles	3,445 miles
Corresponding load	8,240 lb.	8,240 lb.

This pannier can carry loads (fairly dense, one supposes) of up to 8,000 lb. weight. If all 11 passengers are carried, with their luggage, over the maximum range with normal tanks of 2,530 miles, they will not leave all of the 8,000 lb. load available for the pannier, but only some 5,250 lb. However, even this would be an acceptable payload if carried in the form of mails. If the gross weight is increased from 65,000 lb. to 68,000 lb., as it can be, the pannier could be loaded to full capacity. Such a combination would, therefore, be quite useful on many of the Empire routes. The table shows that even on much longer ranges the payload is still very substantial at the overload gross weight of 68,000 lb. Hatches fore and aft enable the pannier to be loaded and unloaded from below, and as the pannier itself is raised and lowered by hoists in the aircraft, it would be possible for standardised loads to be placed in readiness in a pannier, ready for transfer as a complete unit to the aircraft, thus making possible a quick "turn-round" at airports, one pannier being unshipped and the waiting one hoisted on board to take its place.

Hermes Freighter

In the cargo version of the Handley Page Hermes, the main structural difference is in the floor. The passenger machine, it may be recollected, has a pressure cabin. This, of course, is not needed for the freighter, and instead there is a specially constructed floor designed to support the very heavy concentrated loads which it may be expected to carry. Lashing points, in the form of large substantial rings, are provided at frequent intervals on the floor and on the fuselage walls. When not in use these rings are located in channels so as to lie flush with the surface.

The main cargo compartment is more than 40ft. long and has a capacity of 3,000 cu. ft. In addition there are two holds in the underside of the fuselage, under the floor. These have a combined capacity of 190 cu. ft., and have loading hatches accessible from the outside. The forward hold can also be reached from inside the machine during flight.

Externally the cargo Hermes differs but little from the passenger version. The most noticeable change is the fitting of large doors on the port side. These doors provide an entrance measuring 9ft. 4in. by 5ft. 9in. for the loading of bulky freight. Loading can be carried out by means of a ramp, gantry or mechanical loading truck.

Speed-effect on Range

Reference has already been made to the efficiency of the Hermes from the point of view of load-carrying capacity as compared with the converted Halifax. From the table of data an additional fact emerges: the effect of increasing the cruising speed is relatively small. When the machine is fitted with long-range tanks and carrying a payload of 8,240 lb., the maximum range is only decreased from 3,445 miles to 3,040 miles by increasing the average cruising speed from 194 m.p.h. to 240 m.p.h. That means, of course, that if a particular cargo is wanted in a great hurry, the operator can oblige the shipper without incurring a prohibitive fuel cost thereby. On the other hand, where punctuality is essential, there is the possibility of increasing the cruising speed on any particular trip in order to fight strong head winds.

That the Hermes will have to be a "mainliner" appears obvious from the wing loading of 53 lb./sq. ft. A long concrete runway would seem to be essential for the take-off; and at the maximum permissible landing weight of 70,000 lb. the wing loading is still about 50 lb./sq. ft., at which loading the touch-down would have to be made somewhere in the 100 m.p.h. neighbourhood. Since, however, the machine is most likely to be used on fairly long stages, it will probably not very often be required to land at a weight of 70,000 lb. It seems probable that the stages will usually be of some 1,500 miles, during which something like 11,250 lb. of fuel will have been consumed, thereby bringing the landing weight down to 63,750 lb., or a wing loading of approximately 45 lb./sq. ft. Even at this relatively long range, the payload will be in the neighbourhood of nine tons.

35,000 AIRMEN TRAINED IN AUSTRALIA

MESSAGES of congratulation on the Australian share in the Empire Air Training Scheme, now closed down, have been exchanged between the Minister for Air of the Commonwealth of Australia, Mr. A. S. Drakeford, and the Secretary of State for Air, Sir Archibald Sinclair. Mr. Drakeford's message reveals that Australia provided 35,000 trained air crew under the scheme.

In the course of his message Mr. Drakeford said: "A magnificent chapter of history has ended with the closing down of the Empire Air Training Scheme. The fact that the Dominions are now able to discontinue large-scale training tells its own story of accomplishment. . . . The scheme enabled the Empire to turn alarming numerical inferiority into overwhelming superiority in numbers and quality of air crew."

The I.C.A.N. Conference

Revival of Activities : Progress of Preliminary Work

By Z. CIOLKOSZ, M.Eng.Sc., A.F.I.A.S.

AFTER five years of inaction the International Committee for Air Navigation has resumed its work, calling meetings of different Sub-commissions and Technical Committees during the month of April in Paris.

These meetings took place in preparation for the Plenary Session, which, according to information received from the Secretariat of I.C.A.N., will be held in the late summer of this year in London.

One of the principal topics on the agenda of the meetings in Paris was the question of the revision of the Technical Annexes to the Paris Convention of 1919. In the light of recent developments in aviation, these annexes must undergo far-reaching changes and amendments.

The fact that the International Civil Aviation Conference was held in Chicago in 1944 was very helpful in the present deliberations of I.C.A.N. The Chicago Conference prepared Draft Technical Annexes for the new Convention and therefore the present work of I.C.A.N. had to be based on the material collected and partially discussed in Chicago.

Before describing the present meetings of I.C.A.N. in Paris, it is necessary to explain why, after creating a new Civil Aviation International Organisation, which in the future will also regulate all matters connected with air navigation, there is any need for the revival and immediate resumption of the activities of I.C.A.N. It should be remembered that the first intention of the organisers of the Conference in Chicago was the immediate creation of the organisation for the interim period. This organisation intended to establish a special committee charged with drafting the final Convention. It happened, however, that the Chicago Conference succeeded in drafting the permanent Convention on International Civil Aviation in its final wording. This Convention does not include the Technical Annexes, as is also the case in the Interim Agreement on International Civil Aviation. It is obvious that the task of formulating the various rules governing air navigation cannot be accomplished in a few weeks' time, especially as we realise that the existing Conventions, viz., Havana and Paris, are not based on similar principles. It was therefore decided from the start that only the Final Convention may enforce such technical regulations and that the interim period should be utilised to draw up the final proposals for these regulations. This interim period would give to the signatories of the new Convention the benefit of a gradual approach to the final regulations, therefore avoiding unnecessary disturbances in their final appliance.

Bridging the Gap

If we consider that out of 33 States—parties to the Paris Convention—25 participated in the Chicago Conference, 19 putting their signature on December 7th, 1944, to the Act comprising the Final Convention, seven States (not taking into account Argentine) could not in all probability remain in the future members of the Paris Convention and apply for membership of the new Convention; all this brings us to the conclusion that the future of I.C.A.N. is rather decided upon.

In the present situation, its next important task is to fill the gap which constitutes a lack of up-to-date technical regulations in relation to air navigation in the interim period, i.e., before the Final Convention becomes valid. This task was undertaken by I.C.A.N.; all its Sub-commissions and Committees met "in order to examine the Draft Technical Annexes proposed by the International Civil Aviation Conference held in Chicago, and to establish any modification or addition that it may be necessary to make with regard to these texts, with a view to their subsequent replacement of Annexes A to H of the Paris Convention of October 13th, 1919."

There is still one very important aspect of the I.C.A.N. deliberations which is worthy of mention. In accordance with the resolution and recommendation contained in the Final Act, Part I, International Civil Aviation Conference, Chicago, 1944, "the participating States undertake to forward to the Government of the United States, or the Provisional International Civil Aviation Organisation if it shall in the meantime have been established, by May 1st, 1945, any recommendations which they may have for necessary additions, deletions, or amendments." Faced with the Paris I.C.A.N. meetings, many States postponed the submitting of recommendations, waiting for the results of these deliberations as connected directly with their reply.

As already mentioned, 25 out of the 54 States taking part in Chicago were parties to the Paris Convention.

These figures indicate the influence likely to be exercised on the formulation of the new Technical Annexes by the States which are parties to the Paris Convention. The importance of I.C.A.N.'s work will be seen more distinctly if we bear in mind that of the 40 delegations which signed on December 7th, 1944, their adherence to the new Convention, 19 are members of I.C.A.N. and of the remaining six members (Belgium, Czechoslovakia, Paraguay, Switzerland, Union of South Africa and Yugoslavia), two have since declared their adherence, and the others will probably do so in the near future. This will certainly increase the importance of the work of I.C.A.N. on the final editing of the Technical Annexes of the Chicago Convention.

Although it is still somewhat premature to decide if the number of Technical Annexes and the division of material contained in Annexes A—L, Chicago Convention, will be the same as in the draft, it is regrettable that the limited time allowed for the meetings in Paris did not give the chance of discussing the whole of the Chicago Draft Technical Annexes. In consequence, discussion was limited only to those annexes which have corresponding annexes in the Paris Convention.

Accumulated Experience

It is obvious that these few years of interruption in the work of I.C.A.N. resulted in extremely large amounts of material being brought for discussion before the Conference. The time allowed was therefore too short, especially as a number of States put forward entirely new propositions which differed considerably from the annexes submitted in Chicago.

It is a pity that the Secretariat of I.C.A.N. was not in the position to avoid the same mistakes as occurred in Chicago, where the delegates were faced with the task of discussing the Technical Annexes which they received only at the commencement of particular meetings. The same thing happened in Paris, where not only the amendments, but completely new proposals for the revision of the existing Annexes, were distributed at the beginning of the sessions.

The final results of the work of all Sub-commissions and Committees clearly show us that there is still a very long way to go before the Technical Annexes as submitted in Chicago will be approved universally. Only a few of the Sub-commissions decided to base their work on the Chicago Annexes. The remainder considered that in present circumstances the proposals submitted by members of I.C.A.N., and especially by the United Kingdom, will be much more appropriate for the task of revising the old Annexes.

Taking one by one the Annexes to the Paris Convention, the work was arranged as follows:—

I. *Annex A*: Classification of aircraft and definition; the marking of aircraft; registration of aircraft; call signs.

The discussions on Annex A were based on Annex H of the Chicago Convention, although the influence of this Annex on the proposed amendments was very limited. One of the important items of Annex H, dealing with introducing registration marks of aircraft composed of numbers instead of letters, was rejected.

II. *Annex B*: Certificates of airworthiness (Chicago Conference Annex G).

No changes or amendments have been decided upon. The delegates of the Materials Sub-commission shared the view that this task could not be accomplished within a few days. In consequence, they submitted a proposal to start immediately a study in order to establish the new international airworthiness requirements. In this task the Committee must be assisted by a permanent Technical Secretariat of specially qualified technicians. Although the delegates do not consider Annex G of Chicago as adequate for their work, "nevertheless they consider that on many points Draft Annex G contributes new and up-to-date methods which should serve as a model for those whose task it will be to draft the new international regulations desired by all."

For the time being, the Sub-commission submitted a draft resolution in which it recommends the withdrawal of the

THE I.C.A.N. CONFERENCE

regulations concerning the "Minimum Requirements for Airworthiness Certificates" as provided in its previous resolution No. 780.

III. *Annex C:* Log Books (Chicago Conference, Annex F).

The amendments have been discussed in the light of a new proposal submitted by the Government of India. Annex F of Chicago has also been analysed. Amongst other things, it has been decided as premature to oblige the contracting parties to keep a service log for each aeronautical ground radio station. Regarding the proposal to introduce airscrew log books, the Sub-commission consider it to be necessary to introduce these log books only for variable-pitch propellers.

IV. *Annex D:* Rules as to Lights and Signals; Rules for Air Traffic (Chicago Conference Annexes C and D).

The United Kingdom proposals were used as a basis for discussion of this Annex. These proposals constitute a complete revision of Annex D of the Paris Convention and also Annexes C and D of the Chicago Convention, and were based on the experience of the Royal Air Force and the British Overseas Airways Corporation.

It was the opinion of the United Kingdom delegation that the Operational Sub-commission will not be able to cope with all these Annexes unless the ground has been prepared beforehand. The Secretariat of I.C.A.N. decided to organise a special Sub-committee in order to study the new proposal for Rules of the Air and submit their remarks to the Operational Sub-commission.

The United Kingdom proposals, discussion of which took four full days of debates, were extremely well prepared and only minor amendments were introduced in the final draft.

V. *Annex E:* Operating Crew (Chicago Conference, Annex E).

The amendments to this Annex were completed by taking into account the proposal of the United Kingdom delegation, which presented a complete revision of Annex E of Chicago.

VI. *Annex F:* Aeronautical Maps and Ground Signs (Chicago Conference, Annex J).

The Sub-commission decided to consider the changes in Annex F, using Annex J as a basis for which many delegations prepared their observations. The final conclusion of this Sub-commission reads as follows: "Until the proposed amendments to the text of Annex J of Chicago have been approved by the Interim Organisation it would be extremely difficult to undertake a general revision of the above-mentioned Annex F."

VII. *Annex G:* Collection and Dissemination of Meteorological Information (Chicago Conference, Annex I).

The Sub-Commission decided to prepare a new revised text of Annex G to the Convention of 1919, such revision to be based on the Chicago draft proposals and on the C.I.M.Ae. regulations.

VIII. With regard to Annex I—Radio Communications (Chicago Conference, Annex B), this Annex is not yet inserted in the Paris Convention as the Protocol of Brussels of 1935 dealing with this new Annex is still in process of ratification. Nevertheless, the Wireless Sub-Commission, after examining Annex B of Chicago, thought it advisable to begin at once to prepare the regulations and instructions designed for universal application and formulated its observation that "it would be of the greatest advantage to have the closest possible conformity between the Technical Annexes of these two Conventions in order to facilitate the transition," and "for these reasons the Sub-commission, basing itself on the provisions of Annex B of Chicago, considered it necessary to add to them some fundamental rules on the obligation for radio apparatus to be carried in aircraft . . ."

Although there is no Annex in the Paris Convention dealing with the question of Rescue (Chicago Conference, Annex L) the matter was discussed by the Operational Sub-Commission. The proposals submitted by the Government of India were discussed and approved as the draft recommendation for the parties concerned.

* * *

Analysing the results of the work done by the Technical Sub-Commissions of I.C.A.N., one cannot avoid the impression that the unification of all these regulations concerning air navigation, in the sense of approaching the new situation resulting from the creation of the International Civil Aviation Organisation, will be neither easy nor speedy.

The enormous experience of British and American aviation based sometimes on different methods cannot lead to a unification of their respective rules in too brief a period of time. Therefore the early commencement of the work of the new International Civil Aviation Organisation and creation of a Committee on Air Navigation may expedite this matter. In the meantime the changes introduced in the Technical Annexes of the Paris Convention will help to bridge the gap between the past and the future. This is the great task which I.C.A.N. has undertaken and which should lend inspiration to its future meetings.

We believe that this task will be accomplished, as the work of this organisation has won the highest admiration in the past. It may be useful to mention here the view the general secretary of I.C.A.N., Mr. Albert Roper, expressed in his report completed immediately after the Chicago Conference: "It is certain that I.C.A.N., should it remain in existence, will be anxious in the future as in the past to strive for the unification of regulations so indispensable for the full development of air traffic."

REVIVED

THE passenger air service between Moscow and Berlin by way of Warsaw is again in operation, stated Moscow radio quoted by Reuter.

TO SWEDEN

THE British Overseas Airways Corporation is shortly to open a direct airline between London and Stockholm. The service will operate from Croydon.

The Swedish Aerotransport Company will also open a service with an intermediate landing at Gothenburg.

GUIDANCE WANTED

THE Secretary of State for the Colonies is to be asked by Ceylon for an expert to come out to the Island and advise the country in regard to civil aviation matters. It is hoped that Mr. B. C. H. Crosse, Adviser to the Colonial Office on air transport problems, will be made available to Ceylon for this purpose.

"FAIR FOR ALL"

"WE want the air to be free to all, but we also want it to be fair for all," said Lord Swinton, Minister of Civil Aviation at an Oxford University meeting. "We want a commonwealth partnership in operation, but in that partnership there is nothing exclusive, nothing inconsistent with our international policy."

With regard to our international policy, the Minister said, "I can put our aim in one single sentence—order in the air. For our domestic policy we must have a policy which will cover the whole field, commonwealth, foreign and internal. We want to develop this business of air transport."

ISLAND LINKS

THE Argyll County Council has appointed a committee to confer with the Department of Health and Scottish Airways, Ltd., regarding the possibility of providing landing grounds on the islands of Coll, Mull, and Tiree to enable them to be linked up with the regular air services, with facilities for removing patients by air ambulances.

KARACHI TO COLOMBO

THE Tata air service between Karachi and Colombo has been accelerated from this month. Leaving Karachi at 5.30 a.m. the service reaches Colombo at 4 p.m. the same day, covering a distance of about 1,300 miles within ten hours' actual flying. The service is being operated by Beech Expeditor aircraft.

TRANSATLANTIC

A THREE-TIME-A-WEEK service across the North Atlantic between New York-Foynes with Botwood as an intermediate stop was started this month by the American Export Airlines. Bookings will be held to 16 passengers on the Botwood-Foynes leg of these flights, so that each passenger will be assured of a berth.

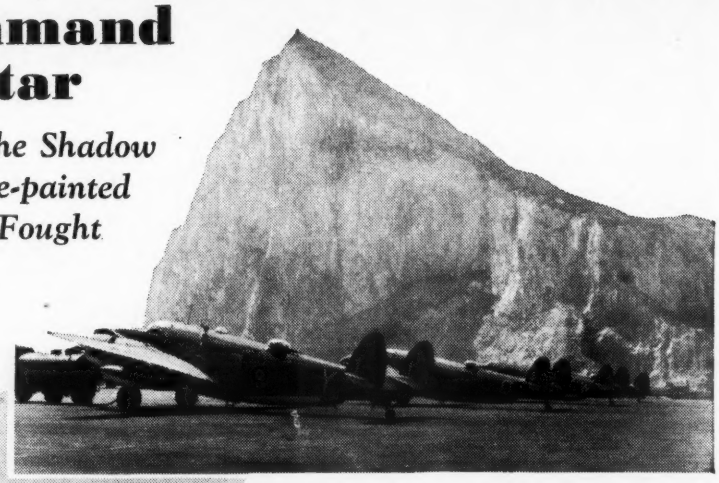
Next month the company starts its fourth year of Transatlantic operations under Civil Aeronautics certificates. First flight to Europe by the *Flying Ace* departed June 20th, 1942, from the company's temporary base at Port Washington.

American Export Airlines are reported to have started a series of survey flights into Poole with the intention of making that port their terminal for the present for their New York-Europe line.

PERFORMANCE & RELIABILITY
ROTOL
ROTOL LIMITED
MADE FAMOUS BY THE PART IT WAS PRIVILEGED TO PLAY IN THE BATTLE OF BRITAIN - SYNONYMOUS WITH THE MOST UP-TO-DATE DEVELOPMENTS IN AIRCRAFT & MARINECRAFT PROPELLERS TOGETHER WITH AERO AUXILIARY EQUIPMENT
ROTOL LIMITED · GLOUCESTER · ENGLAND

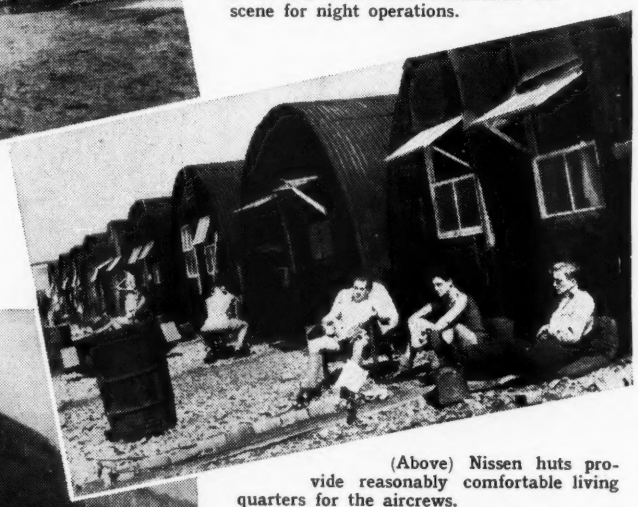
Coastal Command at Gibraltar

From Their Base Under the Shadow of "The Rock" the White-painted Wellingtons and Venturas Fought the German U-boats off the African Coast



(Above) Venturas of the S.A.A.F. being refuelled on the R.A.F. air base with the famous "Rock" for a background. Powerful floodlights were set in the Rock and illuminated the scene for night operations.

(Above) To provide a necessary increase in runway length the airfield was built out into the sea. Here a Ventura is taking off while off-duty aircrew enjoy a well-earned sunbathe.



(Above) Nissen huts provide reasonably comfortable living quarters for the aircrews.

(Left) R.A.A.F. Wellingtons also operated with "Coastal" from "Gib." The bulge under the nose houses part of their Radar equipment.

(Below) A four-gun turret mounted on a chassis provides useful practice for air-gunners.

IN the ceaseless battle waged against the German U-boats by R.A.F. Coastal Command, a vital part was played by the squadrons stationed at Gibraltar. These included Lockheed Venturas of the S.A.A.F., and the ubiquitous Wimpey flown by R.A.A.F. aircrews.

From their strategic outpost, the crews kept up an unrelenting vigil over the Atlantic waters off the north-west coastline of Africa, attacking all "unterseebooten" which ventured within the wide fan of sea covered by their long-range operations which linked up with the similar activities of other squadrons based in the Azores and farther down the West African shores.

World Weather

Transport Command's Vast Meteorological Service

TRANSPORT COMMAND of the Royal Air Force operates routes that literally span the world, to meet the air transport requirements in all theatres of war. Aircraft are delivered from North America and the United Kingdom to Europe, the Middle East and Burma. Great trunk routes cross the Atlantics, the Pacific, and often circumnavigate the world. But, in addition to the great distances that Transport pilots need to fly on their missions, there are the shorter, but intricate missions such as airborne operations involving the transportations of paratroops, glider-borne troops and freight in close support of army operations. And, by no means least, Transport Command operations include the transportation of important passengers and freight in non-scheduled flights to all parts of the world.

For all these operations, detailed and accurate weather information is essential. For many of them it is imperative that a close forecast must be made of weather stretching over many thousands of miles of the earth's surface. Great sea areas have to be crossed, such as the North and South Atlantics, or land areas of a swiftly changing nature. Therefore a vast and detailed meteorological organisation has been developed to meet the varied requirements.

The weather forecast given to a Transport Command pilot operating on a long flight is prepared to cover his requirements as fully as possible. It is corrected at each halt, and weather indications are also sent by wireless to the aircraft as it progresses along the route.

First, the pilot is given a small weather map which shows the actual positions of bad-weather areas and of pressure systems, i.e., depressions, anticyclones, etc., based on the latest available information.

Cross-section Map

In addition, so that the pilot may see at a glance the cloud layers, dangerous icing areas, etc., he receives a diagram which gives a cross-sectional view of the weather on the route. On this cross-section, the freezing level is marked with a red line, and all cloud below this line is coloured green, to show that dangerous icing is not likely to be experienced in such cloud. The −18 deg. C. level is also shown. This is an important temperature, since at temperature below this the risk of serious icing rapidly decreases.

The clouds between the freezing level and −18 deg. C. line are coloured in red, to serve as a warning to the pilot that icing conditions are to be expected in such clouds.

In addition to the two diagrams already described (a weather map and the cross-section), the pilot is given a written or typed forecast giving detailed information regarding all aspects of the weather on his route. This includes winds at heights ranging from the surface to 15,000 or 20,000 feet, or even higher if necessary, temperatures at these heights, visibility, amount and type of clouds, the height of the base of the clouds, heights at which icing will be experienced, the intensity and type of ice that will form, and the mean sea-level atmospheric pressure. This latter is given in order to ensure that serious errors in heights recorded in the altimeter, due to changes of mean sea level pressure, may be avoided.

The whole route is divided into a number of zones, and the detailed information for each zone is given on a separate form. Forecasts of the weather for landing at the destination airfield and possible diversion airfields are also given.

This information is fastened into a folder, and the whole constitutes the "flight forecast." It is handed to the pilot at the briefing which takes place before every flight. At the briefing, a meteorological officer describes the weather to the pilot and the navigator, and explains the forecast in detail.

So the pilot is given advice on every aspect of the weather to be expected on his flight, and on the basis of this advice the final details of the flight are worked out. The pilot decides the heights at which certain parts of the route are to be flown—he may fly high over bad weather in some zones, or low to avoid a dangerous freezing level in others. He may also adjust his heights to obtain the most advantageous wind, or he may even change his track for some reason. Using the winds given in the forecast, the point of no-return is calculated: that is the point which, when passed, leaves the aircraft with insufficient fuel to return to the airfield from which he has taken off, and it must then go on. The pilot works out the estimated ground speed, having regard to the forecast winds, and hence the estimated duration of the flight. This in turn gives the estimated time of arrival, or E.T.A. as it is usually called.

The pilot also needs to be informed of the future conditions at the airfield of departure, in case he should need to return for any reason, though this is rarely necessary. A point to be remembered here is that conditions quite suitable for take-off may not always be suitable for landing.

To furnish this detailed information, the Met. Officer must study very carefully all the meteorological information at his disposal, and, in wartime, this information—particularly from sea areas—is by no means too plentiful.

Transport Command routes are world-wide, and extend through climatic conditions of every type. Transport Command pilots may therefore, for example, need to be as familiar with the weather of the south-west monsoon in India as they are with the moving depressions that affect our own country. In a matter of a very few days, the Transport Command pilot may fly from cold arctic conditions to hot desert conditions. The training of such pilots, therefore, includes lectures on the weather experienced in all parts of the world where Transport Command aircraft operate.

Scattered all along these routes are meteorological offices to issue forecasts and other meteorological advice to pilots passing through.

Transport operations in support of Army operations need to be considered most carefully in regard to weather, and the meteorological advice required is of a very different character from that required for airline and aircraft delivery operations.

For paratroop and glider operations the surface wind and gustiness are of paramount importance, and an accurate forecast of these is essential to the success of the operation. An incorrect forecast of surface wind might cause a large part of a paratroop and glider-borne unit to become casualties on landing, and thus have serious repercussions on the particular operation. It might also, for example, be necessary to use cloud cover as a protective screen, for paratroop operations, or possibly the complete absence of cloud might be required if the exact spot, called the "dropping zone," on which troops and equipment are to be dropped is to be found at night. Surface visibility is another factor of obvious importance.

One of the most interesting aspects of the work of Transport Command is the organisation of special flights of very important persons, or V.I.P.s.

In this connection, the Senior Met. Officer of Transport Command says:—

"Late in January of this year a small R.A.F. unit was formed to proceed to an overseas destination. Neither the purpose nor place of the mission was disclosed, but the function of the unit was to make the ground arrangements for the safe and timely arrival and departure of a large number of aircraft, and I was in charge of the Meteorological Section of this unit. These aircraft, as it was sub-

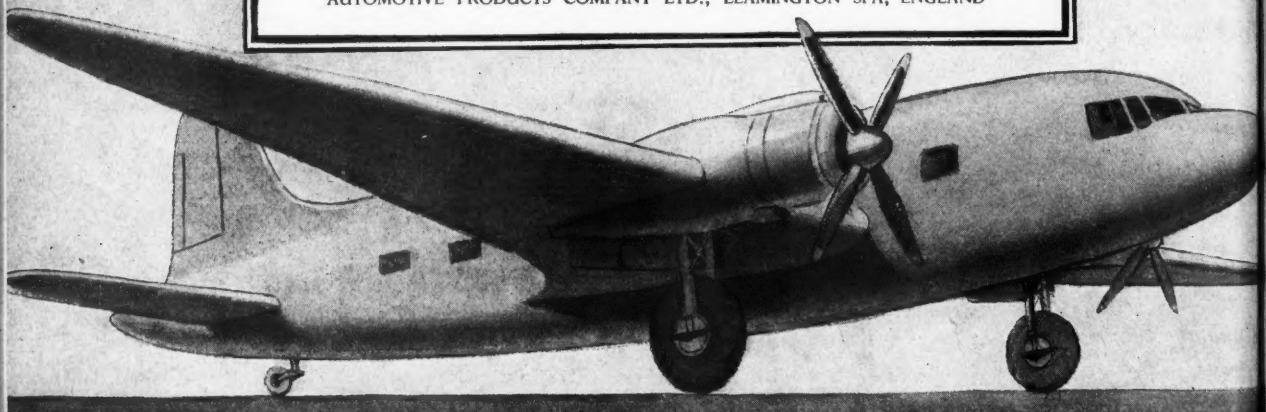
THE 'VIKING'

(Vickers-Armstrong)

The up-to-date equipment on this latest civil transport aircraft includes Lockheed-Avery hoses and self-sealing couplings

LOCKHEED AVERY

AUTOMOTIVE PRODUCTS COMPANY LTD., LEAMINGTON SPA, ENGLAND



sequently learned, were conveying Mr. Churchill and the late President Roosevelt and their staffs to the Yalta Conference; the location of the Met. unit was an airfield in the Crimea. The full story of the work of the R.A.F. unit at the airfield near Yalta will be told elsewhere. All that I shall say here is that the task of establishing in the few days at our disposal, before the arrival of the distinguished passengers, a full and efficient forecasting office involved much hard work and was, at times, I don't mind admitting, not a little worrying, especially as, at the outset, I was quite unfamiliar with the local peculiarities of weather in the Crimea.

"Immediately after the arrival of our unit by air the weather became very bad, with a severe frost and much snow. This was followed by a rapid thaw which produced vast areas of mud. Someone said our expedition should be called 'Mission to Mudscow.' But, on the day scheduled for the arrival of the V.I.P.s, or 'D' Day, as we called it, the weather changed immediately, and we all felt that the fair weather which welcomed the Prime Minister and Mr. Roosevelt augured well for the success of the conference. The whole world now knows what a successful meeting it was. Similarly, on the days on which Mr. Churchill and Mr. Roosevelt left the Crimea, we were again blessed with good weather, though it was not until we received the messages stating that they had arrived safely at their destinations that our mission could be regarded as successfully completed. Having learnt by that time what tricks the Crimean weather could play; how, for example, fog was liable to sweep across the airfield, reducing the visibility from 20 miles to a few hundred yards in less than half an hour, and how heavy snowfall could reduce visibility to practically nil for prolonged periods, I felt even perhaps more conscious of our good fortune in the fair weather which prevailed at Yalta during the all-important days.

Looking Ahead

Variety of Products at Miles Exhibition

WHEN opening an exhibition of products of Miles Aircraft, Ltd., at 54, Brook Street, London, last week, Mr. F. G. Miles stressed the need for research and development and pointed out that these two items have become extremely costly, so much so that where some years ago a project could be developed for a few hundred pounds sterling, it might now require as many hundreds of thousands. There was, he said, much talk of the need for research, but so far little action to encourage it. The best form was that carried out by free men in a free country, a country which was generous to success and not too harsh to failure. It was important that industry should be helped and not hindered.

If there was to be controls and centralised planning, then the time for sudden individual decision and full individual responsibility would be gone, and the speed with which we should compete with other nations must depend upon the speed and efficiency of the Government machine. Post-war plans must depend largely on Government policy, since no resources were available for private planning.

In spite of the fact that Miles Aircraft, Ltd., shares with other firms in the aircraft industry the handicap of lack of draughtsmen and technicians, a very representative exhibition has been collected. The many Miles aircraft types can, of course, be shown in model form only. Of particular interest is the Miles 60, now known as the Marathon, which was designed by Mr. George Miles to one of the specifications of the Brabazon Committee. It is designed for the carriage of fourteen passengers and half a ton of luggage and freight over a distance of 750 miles at a cruising speed of between 175 and 200 m.p.h. Another promising project is the Miles M.56, a 24-passenger transport comparable in size with the D.C.3, but having enhanced performance without sacrifice in take-off and landing characteristics.

It can now also be disclosed that the Miles Messenger had the honour, during the later stages of the German war, of carrying the Prime Minister and Field Marshal Montgomery over the battlefield to give them a bird's-eye view of the situation. Models of many other Miles types are exhibited; these have already been described in this journal.

Something of an eye-opener showing the versatility of Miles Aircraft, Ltd., is afforded by the variety of other items exhibited. The self-aligning plastic bearing was produced at a time when steel bearings were in very short supply, and it has been used by the thousands. Many other products in plastics are shown. A strain-gauge unit with a capacity of 100 gauges obviously has many applications. Several clever production tools are also being shown, while on the operational side there is great interest in an electric fuel cock which controls a flow of 130 gallons per hour at a pressure of 5 lb./sq. in.

Some years ago Mr. Miles carried out full-scale experiments on boundary-layer control. The war put an end to the work, which was promising well, but was necessarily expensive. A model shows how the system worked.

Finally, mention may be made of the Miles anti-g device. This limits the loads which the pilot can put on his aircraft by excessively abrupt manœuvring. It comprises a light weight mounted on a lever arm, the movement of which is restricted by spring loading.

THE SABRE IN KINGSWAY

GREAT interest is shown by the general public in the Napier Sabre exhibition now being held in the showrooms of the English Electric Co. in Queen's House, Kingsway, London. A part-sectioned Sabre engine is shown in slow-motion operation, thus giving an opportunity for studying the relative movements and timing of the pistons, sleeve valves and ignition. A hand-driven example of the valve gear still further simplifies a study of these somewhat puzzling movements and brings out the simplicity of the sleeve-operating gear of this engine.

An item of exceptional interest is the ignition tester, which tells at a glance not only what individual plugs are doing but also discloses any irregularities in the smooth running of the engine and indicates their probable source.

A model, a complete member and a sectioned member of the Sabre mounting, with its shock-damping device, is also shown. A link not only with the past but with the seagoing present is provided by a white-painted Napier Sea Lion engine, which develops 500 h.p. for continuous running.

In opening the exhibition, Sir George Nelson, chairman of the English Electric Co., recalled that Napiers had always been associated with high speeds and that, at one time or another, Napier engines had held the world's speed records on land, on the sea and in the air.

Sir George disclosed that the Sabre-engined Typhoon first went into combat with the *Luftwaffe* in the Dieppe raid of 1942, and recalled the good work this combination had done since in France and Holland. The Hawker Tempest with Sabre engine (developing 2,400 h.p.) came into prominence in connection with the "Doodle Bug" attacks, possessing the speed and fire-power to destroy them. Thousands of civilian lives were saved by a Tempest wing which, operating from a Kent airfield, destroyed some 750 of the flying bombs before they reached London.

DE HAVILLAND REVERSIBLE-PITCH AIRSCREW

ON April 12th it was announced that the de Havilland Dove aircraft would be fitted with reversible-pitch airscrews for use as landing brakes. This small three-blade airscrew model, suitable for engine powers in the 250-350 b.h.p. category, is one of a range of new de Havilland braking airscrews which will shortly enter production. Other models will consist of larger three- and four-bladed designs with aluminium-alloy blades giving diameters up to 17ft. All will be developments of the well-tried Hydromatic design. In previous versions the pitch-change mechanism has incorporated cam slots of two slopes, one for constant speeding, the other for feathering. The new de Havilland braking versions have Z-shaped cam slots, the third slope being used for braking operation.

Rate of pitch change is of the order of 20 deg. per second, which is sufficient to prevent serious over-revving of the engines during passage through the neutral pitch region.

Further developments, coupled with reversing airscrew hubs of radially new and improved design giving much higher rates of pitch change, are also projected. These will extend up to much larger sizes.

Despite the use of arrester gear in pre-war days, it was a long time before high-performance fighters, such as the Seafire, were used on British aircraft carriers.

Lessons of the Air War

Part III—Air Power and Sea Power

By MAJOR F. A. de V. ROBERTSON, V.D.

ONE of the great lessons of the late war with Germany and also of the present war with Japan is that sea power must be supported by air power. It cannot do without it. Aircraft are as necessary as destroyers in the composition of a fleet. To send out warships without the support of aircraft is to ask for trouble, as the Royal Navy learnt to its cost in the grievous loss of two capital ships off Malaya.

Perhaps it is somewhat of an exaggeration to say that this is a lesson of the recent and present wars, for the principle was accepted before 1939; but the German and Japanese wars have provided proof that the principle was correct. They also led to much development of the support which air power could give to sea power, and showed up one or two limitations of the new weapon—limitations which perhaps were only of a temporary nature. The survival of the German warships *Scharnhorst, Gneisenau* and *Prinz Eugen* in Brest Harbour, and their subsequent escape marked at the time a limit to the powers of bomber aircraft. But during that time the British aircraft which attacked the ships had not at their disposal bombs weighing 12,000 lb., let alone ten-tonners. If those missiles had been available then, the story would almost certainly have had a very different ending.

"Find, fix, strike," are the words which the Fleet Air Arm has adopted as its motto. The views of the Admiralty on naval air power were shown before the war by the equipment provided for that arm. It consisted of two classes of aircraft: (1) fighters, and (2) T.S.R. machines. Those initials stand for torpedo-spotter-reconnaissance. Any fleet air force must have fighters; that is now universally accepted. Their business is the defence of the fleet from air attack, and on other occasions the escorting of the T.S.R. machines. The latter were multi-purpose aircraft, and the old proverb is sometimes justified which says that a Jack-of-all-trades is master of none. But the Navy, while showing that it had clearly envisaged the various tasks which its aircraft would have to do, was hampered by hangar limitations on the existing carriers. It had very few carriers, and the biggest and best of them, H.M.S. *Ark Royal,* was only commissioned a short time before the outbreak of war. Therefore, in order to provide for reconnaissance, spotting for the guns, and attack with bomb and torpedo, as well as for air defence, it was necessary to use multi-purpose aircraft.

Aircraft Carriers

Before going farther, it will be as well to note that naval air power does not consist only of carrier-borne aircraft. It needs also shore-based squadrons, some equipped with flying boats and others with landplanes. These were provided by Coastal Command of the Royal Air Force, which we shall consider later on.

One of the main points to note in the recent and present wars is the great increase in the reputation of the aircraft carrier. We have remarked that in 1939 the Royal Navy had very few of them, and only one of those few was modern. Others were being built, and in due course they came to play their part in the naval war. It would probably be unfair to attribute this shortage in 1939 to a lack of foresight on the part of the Lords of the Admiralty or to doubts about the utility of the carrier. It was mainly due to the policy of disarmament and economy which had prevailed for so many years before the Munich crisis.

In other quarters, however, grave doubts were felt about the utility of the carrier. Everyone admitted that

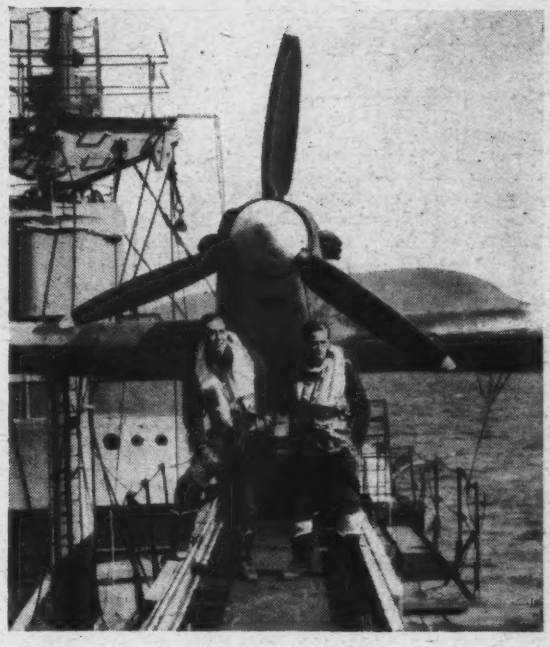
it was vulnerable. It must be fast and it could not be heavily armoured. When flying-off or landing-on aircraft it had to steam steadily into wind, and that might take it far away from the protection of the heavily armoured and heavily armed battleships. It was generally believed that its aircraft could not hold their own against shore-based aircraft. This was never more than a half-truth; for, while carriers cannot even yet accommodate the heaviest type of bomber, their fighters (except, perhaps, the Japanese) were always masters of any bombers sent against them. It has also been found that carrier-borne fighters can well hold their own against shore-based fighters. At first the Royal Navy insisted that its fighters must be two-seaters, so as to relieve the pilot of the responsibility of navigating. Now single-seaters are used, with very satisfactory results.

Italy and Japan

However, Mussolini and his Fascist Ministers, whose object was to dominate the Mediterranean, decided not to build carriers. They believed that their purpose could be achieved by a Navy working with long-range bombers, provided that the latter had plenty of bases. The Royal Navy, however, sent carriers into the Mediterranean, and scored heavily by doing so. Not much is known yet about Japan's naval policy in late years; but it is thought that she believed in having large numbers of small carriers. It was with carrier aircraft that she struck her treacherous blow at Pearl Harbour.

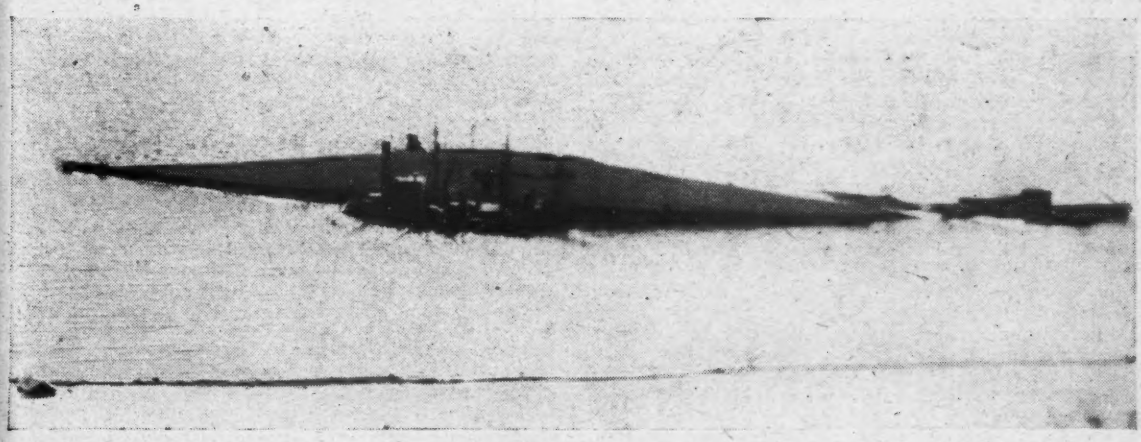
Once the United States began to arm in earnest, her policy was to build many carriers, and large ones. The great distances between her bases and the islands seized by Japan made such a policy inevitable. Until forward bases could be seized American shore-based bombers could not be brought into action; and until Japanese naval power had been reduced such bases could not be seized. The American policy was vindicated in an almost startling manner. The battle of the Coral Sea, which removed the danger of invasion from Australia, was won entirely by the aircraft from the American carriers. The guns of the warships never fired a shot. In the battle of Midway Island the Japanese sent short-based bombers and fighters against the American fleet, but the fighters from the carriers had the best of it. It may be misleading to draw too sweeping a conclusion from that. There is no doubt that the American pilots were better than their opponents, and the victory probably depended more on the men than on the machines.

But we must return to the Mediterranean. At the regrettable, but inevitable, affair at Oran, it was first demonstrated that torpedoes dropped from the air could do serious damage to a capital ship. The victim was the battle cruiser *Dunkerque*. She was afterwards repaired. At Taranto it was shown that ships in harbour need



MERCHANT SHIP FIGHTER UNIT: A Hurricane ready for catapulting from the deck of a C.A.M. ship. When fuel was exhausted the pilots baled out and were picked up out of the sea.

elaborate protection if they are to be kept safe from torpedo-carrying aircraft from a carrier. At the battle of Matapan the Italian ships were faster than the British, and would certainly have escaped if torpedo-aircraft from H.M.S. *Formidable* had not flown ahead of Admiral Cunningham's fleet. The superior speed of the Italian ships was thereby made unavailing. As a result the battleship *Vittoreo Veneto* was badly damaged by a torpedo, and the British fleet came up in time to sink the cruisers *Pola, Zara,* and *Fiume* with gunfire. But there were many Italian forces at sea, and the *Formidable* had not enough aircraft to maintain touch with them all and at the same time to build up a striking force strong enough to deal with the crippled battleship. So the *Vittoreo Veneto* got back to her base. The lesson from this action is that a fleet needs as many carriers as possible, and large ones at that. One cannot have too many aircraft in the sky. This is particularly true when the enemy aircraft are shore-based and therefore are likely to cut-

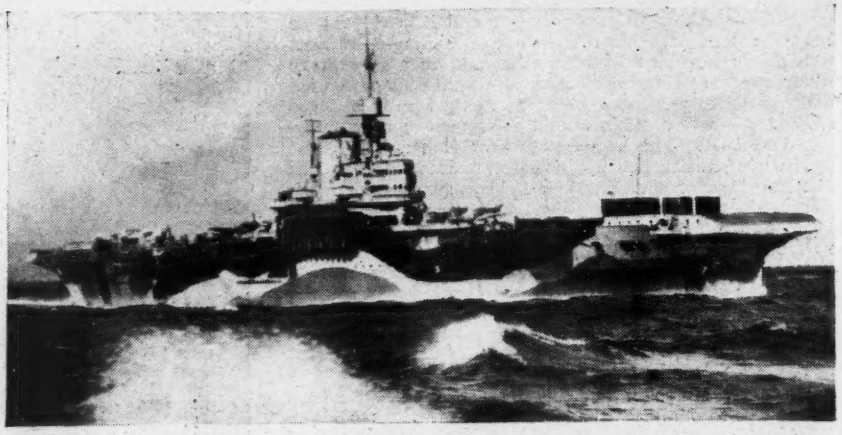


The capsized hull of the German battleship *Von Tirpitz*, which was turned over in Tromsö Fiord by Lancasters of Bomber Command using 12,000-lb. bombs.

LESSONS OF THE AIR WAR

number those from any one carrier. It also appeared that the 18in. torpedo carried by aircraft could cripple, but not necessarily sink, an armoured warship.

The sinking of the *Bismarck* was another case in which the far-seeing eye of aircraft discovered a flying enemy with which our surface ships had lost touch, while a lucky hit with a torpedo on her rudders slowed her up and enabled our capital ships to catch her and sink her.



H.M.S. *FORMIDABLE*. One of the Royal Navy's 23,000 ton aircraft carriers, several of which were under construction at the outbreak of war.

Coastal Command of the Royal Air Force had also suffered from the era of economy and disarmament in the inter-war years. September, 1939, found the Command with five squadrons of flying boats, seven squadrons of Anson landplanes, two of Vildebeest torpedo-carriers, and half a squadron of Hudsons—171 aircraft in all. The types in use were not all of the latest pattern. Some of the flying boats were not Sunderlands but Londons and Stranraers. The Vildebeests could not be used at all, but the squadrons presently received Beauforts, and did very good work with them. The Ansons, though slow, were surprisingly effective, but were in time replaced by Hudsons. Other classes and types were added to the Command until there was hardly any sort of air duty which it could not fulfil.

At first, of course, its duties were reconnaissance over the seas round the British Isles, escorting our shipping convoys, and watching for submarines. These duties it continued to fulfil until the end of the war in Europe; but many more were added to them. Its greatest work was the part it played in the Battle of the Atlantic, and that work constantly called for more and ever more range and air endurance. A base in Iceland helped a lot. Then a base in West Africa with a (so to speak) stepping stone at Gibraltar was added. The West African base was presently made into a separate Command. Finally Portugal gave permission for the Allies to use the Azores, and that, too, was a great help.

Air/Under-Sea Co-operation

The enemy attacks on the convoys were made by long-range aircraft (Kondors) as well as by U-boats. The Kondors did not take much aggressive action themselves, but they spotted our ships and reported to the U-boat packs. Hudsons and other machines of Coastal Command invariably attacked the Kondors when they saw them, and the latter rarely showed much fight. Fighting was not their job, and the crews knew that if their machine was badly damaged in the middle of the Atlantic the chances of getting home safely were slight.

In time Liberators and Halifaxes were added to the Coastal fleet, and depth charges were carried instead of bombs. An excellent system of co-operation between the aircraft and the surface escort vessels was built up, and whenever possible the aircraft which discovered a U-boat, after dropping its own depth charges, would summon destroyers or corvettes to continue the attack. The surface vessels naturally could carry more depth charges than the Liberators could do and could make attack after attack. Still, a substantial number of U-boats fell victims to the aircraft. The warships and the aircraft established a complete understanding.

At the beginning of the war the American Naval Air Service, like our own, suffered from shortage of machines. Consequently at first the U.S. Army Air Forces escorted the convoys on the western side up to the limit of their range. Later on the U.S. Naval Aviation took the job over.

But for a long time there remained a gap in mid-Atlantic which could be covered by neither nation. Hurricanes catapulted off the decks of merchantmen were first used to attack the Kondors in the gap. They filled the German crews with still more dread; but the plan was expensive. The Hurricanes could not be landed on again and had to be abandoned. Sometimes the pilot was also lost after parachuting down into the sea. The small escort carriers relieved the situation, for they could carry reconnaissance machines as well as fighters; and it was possible (though not easy) to land on their small flight decks. Finally very-long-range aircraft were made available, and then the "gap" ceased to be a happy hunting ground for U-boats.

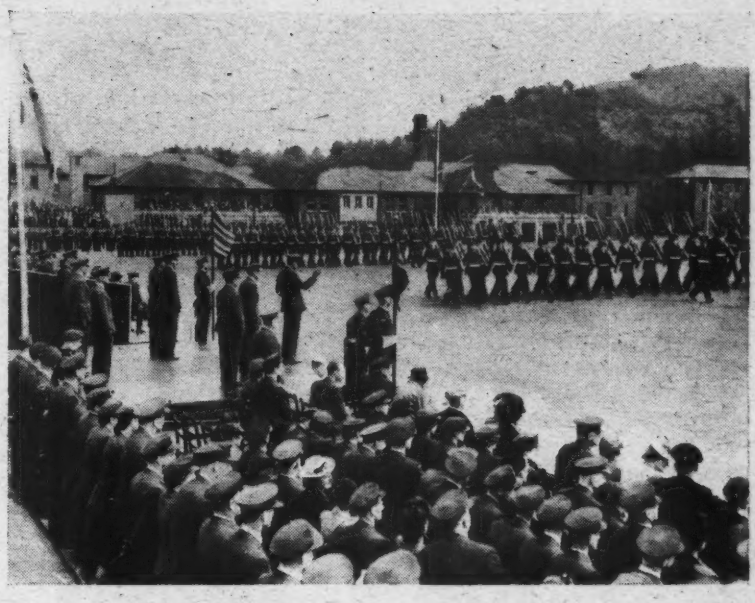
Through the combination of sea power and air power the Battle of the Atlantic was finally won by the Allies. The Admiralty and the Air Ministry worked in the closest collaboration in deciding the plan of campaign.

Another activity of Coastal Command was its anti-shipping strikes. Coastwise traffic gradually grew of increasing importance to the Germans as their railways and canals became overworked and suffered from the attacks of Bomber Command. That Command also undertook to lay sea mines in German waters. Attacks on the shipping, however, were the business of Coastal Command. Along the shores of the occupied countries the supply ships and their escorts were regularly assailed by the torpedo aircraft, the bombers, and the rocket-firing Typhoons of Coastal Command. Very great damage was done. In the last stage of the war there was much coming and going of German transports and supply ships between Norway and either Germany or Denmark. This was attacked, mostly at night, by Halifax bombers, and there were many fierce battles in the Kattegat and Skagerrak.

All through the war the history of Coastal Command has been one of development and, when necessary, of clever improvisation. One cannot readily put one's finger on one point and say that there a lesson in tactics was taught. What was accomplished was what the Allies wanted to see done; but it was not always generally expected that it could be done. The carrying of depth charges instead of bombs, the use of the Leigh light, the development of the very-long-range aircraft, were all unpleasant surprises to the enemy and gratifying surprises to the British public; but the novelty lay rather in the technical development than in any new principle of warfare. That bombers should act as aggressive fighters in mid-Atlantic was also a natural development from a novel situation. What was a surprise to nobody was the courage, the hardihood, and the endurance of the crews which manned the aircraft. Those qualities shone as brightly in Coastal Command as in any branch of the Allied forces.

Halton's Jubilee

Inspection by Lord Trenchard



Marshal of the Air Force Lord Trenchard taking the salute at Halton's jubilee parade.

"NOTHING but the best is any good in the Air Force," said Marshal of the Royal Air Force Viscount Trenchard, G.C.B., G.C.V.O., D.S.O., addressing the aircraft apprentices of Halton on the occasion of the Jubilee celebrations of the school. He went on to say how the Battle of Britain and many other victories since then could not have been won but for the maintenance work done on the aircraft by the predecessors of the apprentices then before him.

It was very suitable that Lord Trenchard should be the inspecting officer on the occasion of Halton's 25th birthday, for the existence of the school is due to his foresight during the time when he was Chief of the Air Staff for many years after the 1918 armistice.

The celebrations took place on May 25th; among those who accompanied Lord Trenchard were Marshal of the Royal Air Force Sir Charles Portal, the present Chief of the Air Staff, and other members of the Air Staff.

The big event of the day was a grand ceremonial parade in which five regular entries of aircraft apprentices and the Polish apprentices took part. It was a lovely spring morning, with the sun shining brightly, and every point of vantage round the spacious parade ground was filled with relatives and friends of the apprentices. At the foot of the dais which formed the saluting base stood two unusually tall and stalwart apprentices, each carrying a standard with stripes of dark blue, light blue and red, which indicate the presence of a Marshal of the Royal Air Force. These apprentices were most remarkable young men, for they stood at attention there from 10.30 a.m. until noon, and they remained at attention when the apprentices on the parade ground were mostly standing at ease. Afterwards, when all proceeded to the Burnett Gymnasium to hear the address of Lord Trenchard, the other apprentices were seated, and must have been mighty glad to get off their legs. Put at the foot of the platform there stood these two with their standards, and they remained at attention right up to the bitter end. It was a remarkable exhibition of stamina, and the two well deserve a special notice.

A Remarkable Parade

The parade itself was likewise remarkable. There was not an officer or sergeant-instructor on the ground. Their normal places were filled by apprentices. Each flight and each squadron was commanded by an apprentice, and the whole parade was in charge of another sergeant-apprentice. Perhaps the Japanese will not be much wiser if it is stated that his name is Meadows and that he lives in Berkeley, Gloucestershire. He, too, was a most remarkable young man, a veritable incarnation of military smartness. Mention must also be made of the corporal-apprentice who commanded the Guard of Honour when Lord Trenchard arrived at Halton Camp.

On parade, in addition to the squadrons, there were three bands, all composed of apprentices. There was a regular military band, whose drum-major could do all the accepted juggling tricks with this staff. A handsome and well-behaved white goat was led at the head of this band. Then there was a composite band, half pipers and half fifes.

The Polish squadron had its own band with silver trumpets. Red triangular banners with the Polish Eagle on them hung from the trumpets of the front rank.

Lord Trenchard first walked round the ranks of every squadron, and this took some time. When he returned to the saluting base the whole parade marched past. The arms drill as the parade sloped their rifles was first class, and must have rejoiced the heart of every old infantry soldier that was present. The same can be said of the marching. The dressing of each squadron was immaculate, and the critical eyes of the said old infantrymen could find no point to criticise. No wonder the onlooking parents and friends burst into rounds of applause as the steady, straight ranks went by! It was a magnificent piece of ceremonial drill; and every apprentice as he stepped out looked the proudest young man in all Great Britain.

Since 1919 Halton has trained some 18,500 apprentices. Of these over 4,000 have gained commissions. One has won the V.C. and one the G.C.

CHANGES IN HIGHER COMMAND

AIR CHIEF MARSHAL SIR SHOLTO DOUGLAS has been appointed Air Officer Commanding-in-Chief, British Air Forces in Germany. After the Armistice of 1918 these forces were termed the Air Force of Occupation.

In the first world war Sir Sholto was a distinguished fighter pilot. Among other appointments he commanded No. 43 Squadron during the battles of Arras in 1917. The squadron was equipped with 16 Sopwith two-seaters. During the recent war he has been A.O.C.-in-C. successively of Fighter Command, Middle East Command, and finally of Coastal Command, which is a unique record.

Air Marshal Sir Leonard Slatter, Coastal Cmd.

He is succeeded at Coastal Command by Air Vice-Marshal (acting Air Marshal) Sir Leonard Slatter, K.B.E., C.B., O.B.E., D.S.C., D.F.C., who has recently been commanding a Group of Coastal Command at the Western Approaches. *Flight* first got to know Sir Leonard in 1927, when he was a Squadron Leader in charge of the High Speed Flight which won the Schneider Trophy at Venice. That was the year of the Supermarine S.5 monoplane, the first low-wing monoplane to win distinction in the R.A.F., and therefore a direct ancestor of the Spitfire. The pilot who actually won the speed race was Flt. Lt. Webster, A.F.C. The engine was a geared Napier Lion.

Soon after the contest Slatter (who is a South African) made a most creditable solo flight from Cairo to Capetown. Subsequently he was Wing Commander in one of the aircraft carriers. During the recent war he commanded a Group in the Middle East and took part in Auchinleck's retreat to Alamein. Since 1943 his Group in Coastal Command has several times been mentioned for good work, and Sir Leonard is obviously well qualified to take charge of the whole of Coastal Command.

Dakotas operating from one of the many Burmese air-strips. The labourers in the foreground are attending to drainage.

Combat Cargo Task Force

The Second Phase—Over the Chindwin to Central Burma : Two Hundred Landing Strips Made

By CHARLES GARDNER, Sqn. Ldr., R.A.F.

ONE of the organisations which emerged from the Imphal battle was the Rear Airfield Maintenance Organisation, which took over the domestic problems of the supply airfields occasioned by the presence on the strip of many units and personnel ranging from Army transport and engineers to coolies. The R.A.M.O. organised the loading parties and parking of aircraft relative to the store dumps.

By the time the monsoon ended and the 14th Army was ready to move over the Chindwin to start its central Burma offensive, Troop-Carrier Command was standing ready to shoulder commitments far heavier than those of Imphal. It had long since been forced to part with the borrowed Squadrons which were urgently needed in the European Theatre, but it had been reinforced substantially from other sources. It had also been regrouped and retitled—its new name being the Combat Cargo Task Force. Brig. Gen. W. D. Old, who had so gallantly led Troop-Carrier Command, returned to America and his place was taken by another American officer, Brig. Gen. F. W. Evans. The force still maintained its integrated American and British content—each Air Force providing approximately 50 per cent. of the total number of Squadrons. Some of the British Squadrons belong to the Royal Canadian Air Force.

At this stage it might be as well to underline a simple and basic fact that has often been overlooked in articles dealing with the work of the Dakotas in Burma. That fact is that not one Dakota could have flown to the 14th Army if the combat forces of Eastern Air Command had not achieved and held complete and utter air superiority over the Japanese Air Force. Tojo's Zekes operating over our rear areas could have caused as much havoc among the unarmed Dakotas as Allied fighters once caused to the German Ju 52s off Tunis. It was prerequisite of the whole plan of air supply that the R.A.F. Spitfires and American Mustangs and Lightnings should have unchallenged might in the skies of Burma. It was to achieve this vital air supremacy that we embarked upon a series of airfield strafes at this time last year—strafes which gave the Japanese Air Force in Burma its death-blow. From the early days of Imphal right down to the end of the Burma campaign the Dakotas were able to carry on with hardly a thought of possible enemy fighter opposition.

Corrugated-iron and native wood are the materials used in building this crude control tower in the Imphal valley.

By November of 1944 the 14th Army was on the move again. With it

COMBAT CARGO TASK FORCE

went its improved air supply companies, its Rear Airfield Maintenance Organisation and its R.A.F. Liaison Officers As part of the essential equipment of every Division were the machines and the men to build air strips. From now on the "Dakota strip" was to become an important part of the 14th Army, and almost the first thing any land unit did on consolidating a new position was to construct its air strip.

Flying over central Burma not long ago I started to count these air strips, but soon gave up. I am told, however, that something like 200 Dakota landing places have been built during the big advances from Imphal to Rangoon.

Unfortunately, as we now reach the latter phases of this gigantic air undertaking—a veil of secrecy begins to shroud the facts. Rightly so, too, because the strength of Combat Cargo and the details of the existing and successful organisation are something which the Japanese are probably employing a lot of Staff officers to compute.

We do know, however, that, trusting in its Dakotas, the Army settled to a routine of—"advance—consolidate—build air strip—receive supplies—advance again." From the Arakan ports Dakota followed Dakota over the mountains to Central Burma—each with its mixed load, neatly tagged for its proper unit of destination and properly routed to the correct air strip—not all as easy as it sounds when the signals were humming 24 hours a day with multi-varied Army demands coming in from the Shweli river to the Chindwin and from the Northern Irrawaddy to the Pakkoku bridgehead.

In addition, Combat Cargo had many scattered Army units to look after by parachute drop, with all its attendant worries of packing, folding and order of "load-release." The West Africans in Kaladan Valley—small patrols of fighting men marching many miles behind enemy lines—these, too, had to be supplied.

Clearing Casualties

A word here about the little brother of the Dakota—the L.5—which has done such great work in going into and coming out from units whose cramped position did not afford them the luxury of a Dakota strip.

To the L.5—buzzing its way forward off the bigger strips—many wounded or sick men owe their lives. All over the battle front L.5 flights of R.A.F. and American pilots have been established—and many are the tales of deeds they have done and of "impossible" landings and takings off. Some of the stories are apocryphal—others are true—and the L.5's effect on morale has been great.

The 14th fought in many isolated places, but, in most of them, its soldiers knew that, if they were hit, they would almost certainly be picked up by an L.5 within hours, and be back at a base hospital—via L.5 and Dakota—in a day. One of the incalculable luxuries of unchallenged air power.

A turbanned Sikh busy in one of the parachute packing yards. There are no spotless linoleum-covered tables available out there.

As the Army advanced down Burma the demands on Combat Cargo Task Force increased. The tenuous land link stretching back to the Bengal/Assam railhead at Manipur became less and less economical. *In time, in cost, in speed and in bulk, air supply came out on top.* (A pointer this to goods air-line operation in remote parts.) Incredible things were delivered by air—steam cranes, locomotives, artillery—all reduced to components, flown in and then reassembled in the field. But, as more and more of Burma was freed, yet another care was committed to the Dakotas—that of the needs of the civil population. There have been some com-

An L 5 with a casualty on board flying back to Base. Such an excellent job has been done by these Stinsons that they are known as Jungle Angels.

COMBAT CARGO TASK FORCE

plaints that not enough was taken in by the liberators for the liberated—but such complaints must be measured against the active needs of an army fighting in the field—and against the aircraft resources of a theatre engaged in a race against time and against the looming monsoon.

The Arakan ports—freed from threat by the 15 Indian Corps coastal advances—were a great boon. Calcutta could be by-passed by ships, which could unload at Chittagong and Akyab—right alongside the airstrips serving the Central Burma front 250 miles away over the mountains. A short haul instead of a long one—and, incidentally, a haul of ideal length for the Dakota—just on its peak point for load and general usefulness.

I have already touched upon the "looming monsoons"—and, by March and April, the inevitable approach of the rains began to dominate the minds of Combat Cargo Planing staff, and of all the pilots. The Allied Land Forces planned to capture Rangoon before the onset of the monsoon proper—but, if they failed so to do the air supply commitment would have to be maintained in the teeth of weather which, at times, is the worst in the world.

The Dakota pilots crossed their fingers while the staff supervised the installation of monsoon aids on the Arakan strips. Blind approach systems and other modern devices were put in on all the all-weather strips. But, even with such aids, flying the monsoon over the 10,000ft. Yoma mountains—some of whose area is even yet uncharted—was not going to be pleasant business, and undoubtedly the air lift was going to suffer when the monsoon broke. The truth of that had been found out at Imphal, where only 540 tons a day were being demanded as against the 2,000 tons now being lifted. The main problem was going to be "the return to base" when the Arakan airfields were shut in, and the flat coastal strip around it but uncomfortably narrow. It was felt, however, that this could be achieved—although the strain of air crews would have carefully to be watched. As it was, some air crews had been doing up to 200 hours a month, although this was now being alleviated by having two complete crews per aircraft.

Airstrip Wear and Tear

The question of all-weather strips was also one which had been engaging a deal of attention. The vital "export" strip at Chittagong showed signs of wear, and was quickly "taken off" for repair, while the Dakotas used a dirt strip alongside during the tail end of the fine weather. At Akyab, too, reserve concrete runways were laid.

At the "receiving" end, in Central Burma, the 14th were, of course, depending on dirt strips—easy to make and, apart from the dust, good for their job. But the rains would soon make a nonsense of all of them—and so precautions had to be taken there.

There are in Central Burma some all-weather strips, and others might have worked at certain times with the help of steel plate coverings. In the last resort there could always be parachute drop.

In the event, as we now know, the 14th Army was as good as its word. It captured Rangoon and so it isn't necessary to fly the present monsoon on a big scale.

Rangoon as I have said fell just as the "chota" monsoon started, and Combat Cargo Task Force could breathe more easily.

In the last days of the fair weather of March, April and the first week of May it had been shifting prodigious loads. The average of just over 2,000 tons per day for March-April was far exceeded—and on one day, I am told, over 4,000 tons was carried by air to the 14th Army.

It was fitting then that, when the first Allied troops entered Rangoon, they were saluted from the air by their faithful Dakotas. The transports dropped a load of fluttering Allied flags over the Burmese capital.

The casualty figures for the Dakota Squadrons have not been high. Some aircraft were lost by enemy action in the days of Imphal and others crashed in bad weather and met with the various accidents which do happen anywhere from time to time. But, on the whole, they have had a wonderful record of safety—probably one unequalled by any other command.

Ground Crews' Work

The work of the ground crews has been terrific—and the servicing organisation spreads its efficient tentacles over the whole of the Burma front. The R.A.F. servicing commando has also been involved on this side of the picture.

A final word about the pilots. In the last 15 months they have done a job which was described by a well-known bomber ace visiting the front as being "the best operational job of the war." In the early periods they had to fly themselves almost to exhaustion and they have had to contend with many dangers. Although they have, at most times, been relatively free from the fear of enemy air attack, they have, however, paradoxically enough, had to meet it on the ground. As recently as six weeks ago, at Meiktila, Dakotas were landing on a strip which was actually under Japanese observed artillery fire. Several Dakotas were hit, including one which had landed to pick up a lot of wounded men.

Pilots from this country who are accustomed to many aids, both in the air and on the circuit, would be amazed to see the conditions in which Combat Cargo Task Force pilots work. By virtue of the transitory nature of the army strips they have only the most portable of equipment—yet these strips have handled a volume of traffic which by far exceeded that ever seen at any of the big public air ports before the war. Quite often the strips have to be put across prevailing winds and it is the exception more than the rule to be able to land into wind. Even when the Dakotas have this luxury, they have to pay for it by taking off down wind. The turn round of the Dakotas is done so quickly that there is no time for taxi-ing from one end of the strip to the other. The result is an almost invariable rule of "land one way—take off the other"—a system which needs the most lynx-eyed of controllers.

Now that the Burma campaign is over, it is to be hoped that Eastern Air Command will produce the full story of Combat Cargo Task Force. The figures of the effort and the plain tale of the seemingly insurmountable difficulties to overcome will astound the world.

£20,000 SHRINE FOR AMERICAN AIRMEN

THE American Second Air Division, which operated from bases in Norfolk, is to have a permanent memorial at Norwich to those who lost their lives.

Men of the division have subscribed £20,000, to be used for the establishment and upkeep of an entrance hall to a new public library, which is to be built on a site near the city hall.

The fund was accepted at a ceremony last week by the Lord Mayor of Norwich (Mr. E. F. Williamson) from Major-General W. E. Kepner, who formerly commanded the division.

PROTEIN FLOWN FROM U.S.

TO help prevent the death by starvation of an estimated 60,000 residents of the Netherlands who have reached a condition that makes normal digestion of food almost impossible, shipments of a protein preparation known as amigen have been flown from the U.S.

Transport Command aircraft of the U.S.A.A.F. carried the cargoes on a schedule that called for delivery in the Netherlands, via the United Kingdom, within 48 hours of leaving an airport on the Atlantic seaboard of the U.S. The Dutch paid for the transportation.

GRIM PROSPECT

MR. HALL L. HIBBARD, whose claims for the pre-eminence of the jet power units of the Lockheed *Shooting Star* fighter are commented upon in our "Here and There" columns this week, has also issued a grim warning about the prospects in any future war.

"Jet and rocket propulsion have been so perfected in this war," he said, "that they would wreck civilisation in a third world war. Jet aircraft have opened up the way to a type of warfare more devastating than the world has ever known; it would be the aim of any future aggressor to wipe out his victim in the first 24 hours of hostilities."

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

SPEED RANGE

Trickery Near the Stall

IN *Flight*, April 26th, on the editorial page, under the heading "Stalling," you mention that when flying was in its infancy the speed range of aircraft was very small; to quote from your paragraph: "In fact, while the Gnome rotary engine was the popular type, one could hardly talk of speed range because the engine had no throttle." That is right up to a point; certainly this was the case with the Monosoupape. You will recall that in 1913 an astonished world was presented with the Sopwith Tabloid, which had a maximum speed of 92 m.p.h., and, as far as I can remember, a minimum speed of 34 m.p.h. This machine was engined with an 80 h.p. Gnome engine, not of Monosoupape type, but an earlier variation with inlet valves in its pistons.

I draw your attention to this because your statement hardly seems to be consistent with facts as they were in 1913. I think also the original Avro 504 with a similar type of engine had a speed range very nearly as wide as that of the Sopwith Tabloid.

R. C. McLEOD.

[We perfectly remember the little Sopwith Tabloid flown by the late Harry Hawker. We also recall the various versions of Gnome rotary engines, from the original 50 h.p. through the 70 h.p. and 80 h.p. to the Monosoupape. The point we wished to make was that one could hardly talk of speed range, since it was very nearly impossible to maintain level flight near the lower end of the speed scale so long as power control merely consisted of a "blip switch." We are quite aware that some of the early machines had quite a range between top speed and the lowest speed at which they could be touched-down after a glide approach, although it used to be said of one type of biplane famous at Hendon in the early days that it "flew at 40 m.p.h. and landed at 50 m.p.h."—ED.]

JETS AND TURBINES

A Question of Propulsion Efficiency

I FEEL I must reply to Mr. A. Stone's criticisms (*Flight*, May 10th) of my letter (*Flight*, April 26th) in which I endeavoured to explain what seemed to me to be the answers to some questions on jet propulsion put forward by Mr. P. A. Hearne in *Flight*, April 12th.

I am afraid I do not see the point in Mr. Stone's obscure reference to a motor car engine, and I think he must have failed to realise that while the b.h.p. developed by a reciprocating engine under a given set of conditions is constant, the thrust h.p. developed by a constant-thrust jet engine depends on the forward speed.

This means that although a Napier "Sabre" engine may develop 2,400 b.h.p. on the test bed, a jet engine of 2,400lb. static thrust will only develop 2,400 h.p. when travelling at 375 m.p.h., as shown by the formula in my previous letter.

Mr. Stone's statement that "there is no question of efficiency to consider" is quite wrong, however, since I was, of course, referring to the propulsion efficiency. Since Mr. Stone has presumably never heard of this, I would state that the propulsive efficiency depends on the difference between the velocity of the aircraft and the velocity of the jet efflux, the greater the difference the lower the efficiency. Thus, if we assume, for the sake of argument, that the velocity of the efflux is the same at all forward speeds, it is obvious that the lower the speed of the aircraft the lower the propulsion efficiency. Perhaps it might have been better, however, if I had used the word "performance" instead of "efficiency," since the performance is usually based on the horse-power available, and it is one of the inherent characteristics of the jet engine that the horse-power available at low forward speeds is also low.

I am afraid the facetious reference to my asumption that the fuel consumed per hour would be found by trial rather leaves me cold. Is there anything impossible in fuel-consumption flight tests?

I must emphasise at this point that my method of comparing fuel consumptions is not based on practical experience but on the use of common sense and a little mathematics, and I think this difficuly could easily be cleared up if some expert could tell us how the fuel consumption per t.h.p./hr. of a jet engine is determined in practice. Or is it still a secret?

Concerning Mr. Stone's last point, I am completely mystified as to how he deduces that the horse-power of a jet engine increases as the cube of the speed, and I am sure we should all be very grateful if he would give us a mathematical proof of it. Just what the resistance of the body has to do with the thrust developed inside the jet engine rather escapes me, but perhaps he would be good enough to explain this also.

S. H. W. PRINCE.

AIR ARM PARADOX

Sidelight on the "Agamemnon" Trial

AS the pilot of the aircraft from which the *Agamemnon* was bombed in the trial referred to by Mr. Hurren in "Air Arm Paradox" (*Flight*, April 26th) it occurs to me that some further details of the trial might be of interest.

The bomb-aimer was Grp. Capt. J. K. Wells, A.F.C., who, I am glad to say, is still going strongly; in fact I saw him only a few days ago. The aircraft used were Handley Page 0/400s and the second machine shed an airscrew when well away from Gosport—our base—but was safely brought back there by Flt. Lt. Sawyer who, I believe, is now with Fairey, at Hayes.

The failure of the electric signalling device (red, yellow and green lights) occurred about half way out to the target area of the Isle of Wight, but fortunately I had a small ball of string in the pocket of my "Sidcot," and tying the loose end to my right ankle, I threw the ball back to Wells, who was lying prone on the floor about six feet behind me; he then released enough string to enable me to tie the other end to my left ankle after I had cut off the surplus. Zero hour had almost arrived by this time and we had only a few minutes' practice with the makeshift before starting our first official "run up." I was intrigued to find how extremely sensitive the ankles were to the feel of the string, as the slightest tension could be felt instantly.

I never had the least doubt that aircraft would establish complete mastery over surface ships, and it seemed to me only a matter of increasing the size of the bomb (or torpedo) and attacking with a hundred or more aircraft from all points at once to make destruction a certainty. I tried frequently to convince "non-believers" of my views by published articles and wordy arguments, but fear I did not make many converts.

Apart from bombing, I have often wondered what is the record number of different types of aircraft flown by a test pilot. I have flown 126 myself and know at least one well-known director of a famous aircraft manufacturing company who has exceeded my total by a considerable margin. My list includes single- and multi-engined flying boats, seaplanes, amphibians, fighters, bombers, etc., many of which, I expect, have never been heard of by the pilots of to-day.

My last flight was in 1938 after an innings of 23 years, but I would much appreciate the opportunity of trying a few of the latest products of the aircraft industry; I fear, however, the chance of this is remote.

C. A. REA.

"TUNS" AND "GALLUNS"

Confusion Over U.S. and U.K. Measures

I AM sure many people feel the same difficulty as I do owing to the prevailing confusion between British and United States tons and gallons. Those who have been initiated into the mystery are forced to adopt the cumbersome practice of specifying Imperial gallons, U.S. gallons and U.S. tons in order to avoid pitfalls. As for the uninitiated, whose name is legion, they are doomed to dwell in confusion and error.

As a practical and easy means of clearing up the muddle, I would suggest that the spelling of U.S. tons and gallons might with advantage be changed to "tuns" and "galluns" (or perhaps "galuns"), respectively. This will offend nobody, least of all the Americans, since in the United States the spelling of many common words has been Americanised, as, for instance, "tho," "thru," "color," "nite" and "aluminum." "Tuns" and "galluns" will, therefore, have plenty of friends and will not feel lonely.

I hope this modest suggestion will be considered by the authorities concerned, both in England as well as in the United States, and some action taken in order that confusion may be avoided in the future.

"GARUDA."

Air Vice-Marshal C. E. W. Lockyer, C.B., taking the salute at a march-past of glider pilots at a recent passing-out parade.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Appointments

THE Air Ministry announces the following R.A.F. appointments:—

Brigadier JAMES THOM DURRANT, D.F.C., S.A.A.F., to be Air Officer Commanding a Group, Air Command, South East Asia, with the rank of Major-General.

Air Commodore ANDREW MCKEE, C.B.E., D.S.O., D.F.C., A.F.C., to be Air Officer Commanding No. 205 Group, Mediterranean Allied Air Force.

Brigadier J. T. Durrant has been A.O.C. of No. 205 Group since 1944. He was South Africa's youngest brigadier, having only recently celebrated his 32nd birthday.

He joined the S.A.A.F. Reserve when he was 19, and was a cadet in the permanent Air Force in 1933. After serving as a flying instructor he passed a special course at the R.A.F. Photographic School at Farnborough, returning to the Union where he did aerial survey work.

He took part in the Abyssinian campaign, in which he gained the D.F.C., and in 1941 he commanded a squadron which was part of the Desert Air Force.

Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Bar to Distinguished Service Order

Act. Group Capt. A. F. ANDERSON, D.S.O., D.F.C., R.A.F. (Capt. the Royal Warwickshire Regt.).—As commanding officer of several squadrons, Group Capt. Anderson has displayed the highest standard of efficiency, great drive and outstanding devotion to duty. Much of the great success of the squadrons under his command can be attributed to this officer's brilliant leadership and tactical ability. Since being awarded the Distinguished Service Order, Group Capt. Anderson has participated in very many sorties, during which much loss has been inflicted on the enemy. Throughout he has continued to display a high degree of bravery, setting an example which has inspired all.

Act. Wing Cdr. S. BAKER, D.S.O., D.F.C., R.A.F.V.R., No. 635 Sqn.—Wing Cdr. Baker has completed one hundred sorties, all of them against strongly defended enemy targets. He has displayed the highest qualities of skill and bravery, and throughout his devotion to duty has been unfailing. Undeterred by the heaviest opposition, Wing Cdr. Baker has invariably pressed home his attacks with the greatest resolution. His achievements have won high praise.

Distinguished Service Order

Act. Wing Cdr. T. BALMFORTH, D.F.C., R.A.F.O.—Since being awarded the Distinguished Flying Cross this officer has participated in a large number of sorties and has displayed the highest qualities of skill and leadership. By his great tactical knowledge, perseverance and enthusiasm he has done much to raise the operational efficiency of all under his command to the highest standard. He has set a magnificent example.

Act. Wing Cdr. W. W. J. LOUD, D.F.C., R.A.F.V.R.—This officer has led large formations of aircraft on various sorties, during which operations great loss has been inflicted on the enemy, including the destruction of 46 aircraft, some 290 mechanical vehicles, numerous locomotives, and much rolling stock; very many barges and several steamers have also been most effectively attacked. The success achieved is an excellent testimony to the exceptional skill, brilliant leadership and great bravery shown by Wing Cdr. Loud, whose example has inspired all.

Wing Cdr. C. V. J. PRATT, No. 38 Sqn. (since deceased).—Wing Cdr. Pratt took part in a large number of operational sorties. His personal courage, enthusiasm and devotion to duty were a continual source of inspiration to his squadron. In July, 1942, he made an attack on a large enemy tanker escorted by two destroyers. After shadowing the vessel for some while, he attacked at close range, following this with a second attack in the face of intense anti-aircraft fire. The tanker was probably destroyed. This officer's fine leadership was largely responsible for the many successes achieved by his squadron. His tireless efforts in the development and improvement of night torpedo tactics were of inestimable value.

Act. Wing Cdr. R. BAKER, D.F.C., R.A.F.V.R., No. 97 Sqn.—This officer has participated in more than sixty bombing missions, during which he has attacked a wide range of enemy targets. He has displayed skill and courage of a high order and his determination to attack his targets with the greatest accuracy has set a very fine example. The successes he has achieved are a fine tribute to his sterling qualities.

Act. Sqn. Ldr. R. W. TURKINGTON, D.F.C., R.A.F.V.R., No. 601 Sqn.—Since the award of a Bar to the Distinguished Flying Cross, this officer has completed many more operational sorties. He has a distinguished record as a close support leader. Many times he has destroyed his target through sheer dogged persistence, machine gunning repeatedly until his ammunition was exhausted. On one occasion in December, 1944, Sqn. Ldr. Turkington led a formation of aircraft against an enemy strongpoint, and, despite heavy fire from the defences, made no fewer than six attacks until the target was reduced to burning wreckage. On another occasion this officer's aircraft was very severely damaged by anti-aircraft fire, but, although it was impossible to maintain control, he succeeded in flying safely back to base, where he made a masterly landing. An outstanding squadron commander, Sqn. Ldr. Turkington has always displayed great courage, brilliant leadership and unswerving devotion to duty.

Act. Flt. Lt. G. M. BLUMER, R.A.A.F., No. 450 (R.A.A.F.) Sqn.—This officer has completed a very large number of sorties against a wide range of enemy targets. He has displayed skill and courage of a high order and throughout his determination has been unbeatable. In March, 1945, in an attack on several enemy barges, Flt. Lt. Blumer's aircraft was hit and damaged. He himself was wounded, suffering a broken leg. Although in much physical distress, this brave pilot flew back to a landing ground and brought his aircraft safely down with the undercarriage retracted. He displayed outstanding fortitude and resolution and his conduct impressed all.

Bar to Distinguished Flying Cross

Act. Wing Cdr. W. E. ROBERTS, D.F.C., R.A.A.F., No. 460 (R.A.A.F.) Sqn.—Since the award of the Distinguished Flying Cross, Wing Cdr. Roberts has completed a second tour of operational duty. He has attacked such heavily defended targets as Essen, Duisburg and Russelheim, as well as precision targets in France. He has also flown in close support of the Army. Throughout, he has displayed great skill and courage. As captain of aircraft, his fine airmanship and coolness in the face of the enemy has set an inspiring example to all. On one occasion, during an attack on Le Havre, his aircraft was hit by fire from the enemy's defences, the navigator being badly wounded and many flying instruments destroyed. Despite this, with great skill, he flew the aircraft safely back to this country.

Sqn. Ldr. F. W. BOYLE, D.F.C., R.A.A.F., No. 627 Sqn.—Sqn. Ldr. Boyle has participated in a very large number of sorties during his two tours of operations. Since the award of the Distinguished Flying Cross he has participated in further operations, including attacks against such important targets as Munich, the Dortmund-Ems Canal and Stuttgart. He has continued to operate with outstanding navigational skill and determination. Throughout his tour he has given the utmost assistance to his pilots, and by his cool courage in the face of danger and unfailing devo-

tion to duty he has materially contributed to the successes achieved by his squadron.

Act. Sqn. Ldr. P. H. SWAN, D.S.O., D.F.C., R.A.A.F., No. 635 Sqn.—Since the award of the Distinguished Service Order, Sqn. Ldr. Swan has participated in further sorties against the enemy, in which he has always played a most difficult and responsible rôle. This officer has often made several runs over his target, in the face of great opposition, to ensure complete success. Sqn. Ldr. Swan's ability, leadership and unswerving devotion to duty have set an inspiring example to his crew and to the other members of his squadron.

Act. Flt. Lt. R. C. DAVIE, D.F.C., R.A.A.F., No. 207 Sqn.—Flt. Lt. Davie has completed a successful operational tour which has included many sorties against major targets in Germany. He has always pressed home his attacks with the utmost determination and skill, and has completed all his missions. Since the award of the Distinguished Flying Cross, Flt. Lt. Davie has continued to display excellent leadership, courage and devotion to duty.

Act. Flt. Lt. S. H. JOHNSON, D.F.C., R.A.A.F., No. 7 Sqn.—Since the award of the Distinguished Flying Cross, Flt. Lt. Johnson has continued to operate with the greatest skill and accuracy, in the most hazardous circumstances. His painstaking attention to detail and singleness of purpose when over his target have been largely responsible for the outstanding successes achieved by his crew.

F/O. A. H. DREW, D.F.C., R.A.A.F., No. 582 Sqn.—Since the award of the Distinguished Flying Cross, F/O. Drew has participated in many operational sorties, including attacks against such heavily defended and important targets as Stuttgart, Cologne and Duisburg. Throughout, he has continued to display outstanding skill and initiative, which, combined with his high courage and unfailing devotion to duty, have been most praiseworthy.

Flt. Lt. J. E. COX, D.F.C., R.C.A.F., No. 420 (R.C.A.F.) Sqn.—Flt. Lt. Cox has a splendid operational record. He has completed two tours of operations which have included attacks against many important and difficult targets. Undaunted by the hazardous circumstances he has encountered, Flt. Lt. Cox has always shown fearless courage in combat, superb airmanship and consistent devotion to duty.

Flt. Lt. R. LAWS, D.F.C., R.C.A.F., No. 640 Sqn.—Flt. Lt. Laws has now completed a second tour of operations, which has included attacks against such major targets as Magdeburg, Duisburg, Essen and Homberg, and others in support of our front line troops. At all times he has shown a fine fighting spirit and the utmost courage and determination in the face of enemy opposition. During a daylight attack against Munster in September, 1944, the aircraft in which he was flying was hit by anti-aircraft fire. One engine failed and shell fragments penetrated the bomb aimer's compartment. Undaunted, Flt. Lt. Laws bombed the target with cool determination which earned the admiration and confidence of all his crew.

Flt. Lt. W. J. L. WEICKER, D.F.C., R.C.A.F., No. 405 (R.C.A.F.) Sqn.—This officer has completed two tours of operations, which have included attacks against such heavily defended targets as Berlin, Essen and Stuttgart. He has always shown the utmost determination to reach and bomb his objective despite all enemy opposition. Since the award of the Distinguished Flying Cross, Flt. Lt. Weicker has continued to maintain a high standard of leadership, courage and devotion to duty.

Act. Flt. Lt. T. K. EDWARDS, D.F.C., R.C.A.F., No. 582 Sqn.—Since the award of the Distinguished Flying Cross Flt. Lt. Edwards has continued to operate with courage and devotion to duty of a high order. A determined and skilful air bomber, he has played a large part in the many successes achieved by his crew.

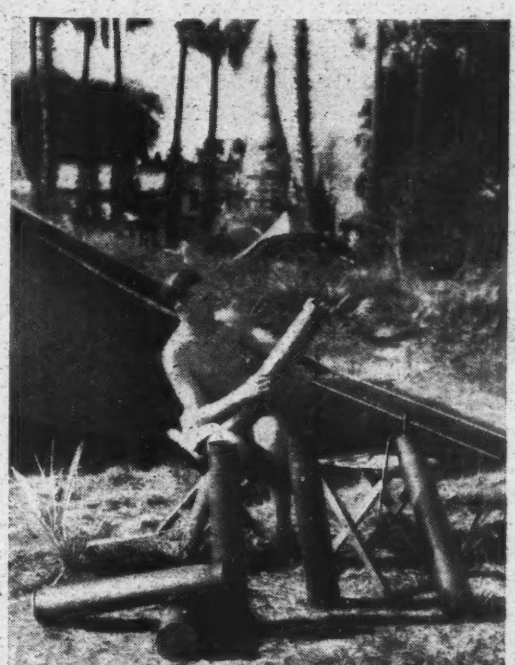
Act. Flt. Lt. P. HEATON, D.F.C., R.C.A.F., No. 640 Sqn.—Since the award of the Distinguished Flying Cross, this officer has completed a second tour of operations. He has participated in many further sorties, which have included attacks against such heavily defended targets as Magdeburg, Essen, Duisburg and Brunswick. During a daylight attack against Munster in September, 1944, his aircraft was damaged by anti-aircraft fire. One engine was rendered unserviceable and the navigation instruments were damaged. Undeterred, Flt. Lt. Heaton calmly guided his aircraft to the target, which was successfully bombed, and safely navigated it through the enemy defences back to base. Both in the air and on the ground Flt. Lt. Heaton has always shown outstanding skill, enthusiasm and devotion to duty, which have won the admiration of the whole squadron.

Act. Flt. Lt. T. W. KETTLEWELL, D.F.C., R.C.A.F., No. 405 (R.C.A.F.) Sqn.—Since the award of the Distinguished Flying Cross, Flt. Lt. Kettlewell has completed many further sorties, which have included attacks against such major targets as Essen, Dortmund and Karlsruhe. It has sometimes been necessary to make two or three runs over the target before dropping the bombs. Despite this and the intense opposition he has often encountered, Flt. Lt. Kettlewell has always pressed home his attacks with the utmost determination and skill. He has shown himself to be an excellent captain of aircraft, and his courage and devotion to duty at all times have been most commendable.

Act. Flt. Lt. A. B. S. LYNDON, D.F.C., R.C.A.F., No. 105 Sqn.—Flt. Lt. Lyndon has continued to operate with courage and determination since the award of the Distinguished Flying Cross. He has participated in many further sorties against vital targets in Germany. A skilful navigator, this officer has materially contributed to the successful completion of many missions. His devotion to duty at all times has been most praiseworthy.

Act. Flt. Lt. G. W. WEBB, D.F.C., R.C.A.F., No. 405 (R.C.A.F.) Sqn.—Flt. Lt. Webb has completed two tours of operational duty, which have included attacks against a wide range of targets in Germany and enemy occupied territory. Regardless of enemy opposition he has always shown the utmost determination to complete his missions. He has proved himself to be an excellent leader. Since the award of the Distinguished Flying Cross this officer has continued to maintain a high standard of keenness, courage and devotion to duty.

SERVICE AVIATION



THE CARILLON: Padre C. E. W. Bellingham, of New South Wales, "tuning" some shell cases as bells for his camp church on an airstrip in Burma.

Act. F/O. W. G. FORSBERG, D.F.C., R.C.A.F., No. 405 (R.C.A.F.) Sqn.—Since the award of the Distinguished Flying Cross, F/O. Forsberg has completed many further sorties against major German targets. As captain of aircraft he has continued to operate with outstanding skill and determination. His courage and devotion to duty have always been of the highest order.

Distinguished Flying Cross

Act. Flt. Lt. G. H. SOBERING, R.C.A.F., No. 115 Sqn.
F/O. J. A. C. BOUCHARD, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
F/O. J. E. CROSS, R.C.A.F., No. 10 Sqn.
F/O. H. A. FITZGERALD, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
F/O. W. J. GRIFFITH, R.C.A.F., No. 10 Sqn.
F/O. H. J. HAWLEY, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
F/O. R. G. HERBERT, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
F/O. J. J. L. M. HOUDE, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
F/O. L. F. JAMES, R.C.A.F., No. 101 Sqn.
F/O. A. C. MCCOLL, R.C.A.F., No. 10 Sqn.
Wing Cdr. H. J. F. LE GOOD, A.F.C., R.A.F.O., No. 635 Sqn.
Act. Wing Cdr. F. W. TWIGGS, R.A.F.V.R., No. 83 Sqn.
Act. Sqn. Ldr. R. G. ALLEN, R.A.F.V.R., No. 622 Sqn.
Act. Sqn. Ldr. D. V. ANDERSON, R.A.F.V.R., No. 141 Sqn.
Act. Sqn. Ldr. A. W. FARRELL, A.F.C., R.A.F.V.R., No. 105 Sqn.
Act. Sqn. Ldr. R. H. FARRELL, R.A.F.V.R., No. 515 Sqn.
Act. Sqn. Ldr. M. P. FELLOWES, R.A.F.V.R., No. 109 Sqn.
Act. Sqn. Ldr. F. C. JANES, R.A.F.V.R., No. 10 Sqn.
Act. Sqn. Ldr. W. F. JORDAN, R.A.F.V.R., No. 619 Sqn.
Flt. Lt. R. V. ALLAN, R.A.F.V.R., No. 97 Sqn.
Flt. Lt. P. H. CLEAVER, R.A.F.V.R., No. 85 Sqn.
Flt. Lt. J. F. DALY, D.F.M., R.A.F.V.R., No. 627 Sqn.
Flt. Lt. F. G. FRENCH, R.A.F.V.R., No. 83 Sqn.
Flt. Lt. A. W. HUCKLE, R.A.F.V.R., No. 640 Sqn.
Flt. Lt. D. J. KINGSBURY, R.A.F.V.R., No. 10 Sqn.
Flt. Lt. M. H. MIDDLETON, D.F.M., R.A.F.V.R., No. 622 Sqn.
Flt. Lt. C. F. MULLER, D.F.M., R.A.F.V.R., No. 105 Sqn.
Flt. Lt. M. H. C. PHILLIPS, R.A.F.V.R., No. 85 Sqn.
Flt. Lt. C. G. ROGERS, R.A.F.V.R., No. 617 Sqn.
Flt. Lt. D. V. SMITH, R.A.F.V.R., No. 85 Sqn.
Flt. Lt. W. C. WILSON, A.F.C., R.A.F.V.R., No. 139 Sqn.
Act. Flt. Lt. J. A. BURGESS, D.F.M., R.A.F.V.R., No. 101 Sqn.
Act. Flt. Lt. R. R. CAREY-EVANS, R.A.F.V.R., No. 640 Sqn.
Act. Flt. Lt. R. J. CUPIT, R.A.F.V.R., No. 207 Sqn.
Act. Flt. Lt. L. A. DAVIES, R.A.F.V.R., No. 61 Sqn.
Act. Flt. Lt. J. W. DRIVER, R.A.F.V.R., No. 578 Sqn.
Act. Flt. Lt. R. W. H. GOODRUM, R.A.F.V.R., No. 640 Sqn.
Act. Flt. Lt. R. T. HUSSEY, R.A.F.V.R., No. 622 Sqn.
Act. Flt. Lt. J. F. KELHAM, R.A.F.V.R., No. 158 Sqn.
Act. Flt. Lt. G. R. KENT, D.F.M., R.A.F.V.R., No. 76 Sqn.
Act. Flt. Lt. W. C. KERR, R.A.F.V.R., No. 10 Sqn.
Act. Flt. Lt. R. B. KING, R.A.F.V.R., No. 77 Sqn.
Act. Flt. Lt. E. K. MARTIN, D.F.M., R.A.F.V.R., No. 139 Sqn.
Act. Flt. Lt. G. C. SKELTON, R.A.F.V.R., No. 467 (R.A.A.F.) Sqn.
Act. Flt. Lt. W. K. THOMAS, R.A.F.V.R., No. 622 Sqn.
Act. Flt. Lt. J. S. WATSON, R.A.F.V.R., No. 158 Sqn.
F/O. F. W. A. ASKER, R.A.F.V.R., No. 578 Sqn.
F/O. J. BARRIE, R.A.F.V.R., No. 49 Sqn.
Act. Flt. Lt. V. B. ANSELL, R.A.F.V.R., No. 550 Sqn.
Act. Flt. Lt. L. ARTHUR, R.A.F., No. 576 Sqn.
Act. Flt. Lt. W. J. BENTLEY, R.A.F.V.R., No. 35 Sqn.
Act. Flt. Lt. V. BRAMMAR, R.A.F.V.R., No. 7 Sqn.
Act. Flt. Lt. H. W. BRATLEY, R.A.F.V.R., No. 7 Sqn.
Act. Flt. Lt. B. BRESSLOF, R.A.F., No. 635 Sqn.
Act. Flt. Lt. W. J. BROOKES, R.A.F.V.R., No. 78 Sqn.
Act. Flt. Lt. J. E. BROWN, R.A.F.V.R., No. 582 Sqn.
Act. Flt. Lt. P. H. CLIFTON, R.A.F.V.R., No. 408 (R.C.A.F.) Sqn.
Act. Flt. Lt. W. N. COOK, R.A.F.V.R., No. 35 Sqn.
Act. Flt. Lt. N. C. CRESSWELL, R.A.F.V.R., No. 109 Sqn.
Act. Flt. Lt. A. B. CURTIS, R.A.F.V.R., No. 35 Sqn.
Act. Flt. Lt. J. E. DAWES, R.A.F.V.R., No. 139 Sqn.
Act. Flt. Lt. R. H. N. HICK, R.A.F., No. 90 Sqn.
Act. Flt. Lt. D. C. JENKINS, R.A.F.V.R., No. 155 Sqn.
Act. Flt. Lt. W. A. JONES, R.A.F.V.R., No. 109 Sqn.
Act. Flt. Lt. C. KODER, R.A.F.V.R., No. 625 Sqn.
Act. Flt. Lt. B. R. MARKS, R.A.F.V.R., No. 106 Sqn.
Act. Flt. Lt. G. W. MATTHEWS, R.A.F.V.R., No. 83 Sqn.
Act. Flt. Lt. A. W. PARLOUR, R.A.F.V.R., No. 51 Sqn.
Act. Flt. Lt. G. A. PERROTT, R.A.F.V.R., No. 625 Sqn.
Act. Flt. Lt. D. PHILLIPS, R.A.F., No. 218 Sqn.
Act. Flt. Lt. G. N. ROSE, R.A.F.V.R., No. 635 Sqn.
Act. Flt. Lt. J. SHEPHERD, R.A.F.V.R., No. 149 Sqn.
Act. Flt. Lt. A. SLINN, R.A.F.V.R., No. 158 Sqn.
Act. Flt. Lt. S. R. SMITH, R.A.F.V.R., No. 158 Sqn.
Act. Flt. Lt. L. H. TAYLOR, R.A.F.V.R., No. 153 Sqn.
Act. Flt. Lt. C. J. WAIT, R.A.F.V.R., No. 186 Sqn.
Act. Flt. Lt. A. J. WARD, R.A.F.V.R., No. 617 Sqn.
Act. Flt. Lt. J. W. WATKINS, R.A.F.V.R., No. 109 Sqn.
Act. Flt. Lt. T. C. WAUGH, R.A.F.V.R., No. 75 (N.Z.) Sqn.
Act. Flt. Lt. A. H. E. WELCH, R.A.F.V.R., No. 35 Sqn.
Act. Flt. Lt. A. A. WHEELER, R.A.F.V.R., No. 153 Sqn.
Act. Flt. Lt. W. E. WILLIS, R.A.F.V.R., No. 51 Sqn.
Act. Flt. Lt. C. M. WILSON, R.A.F.V.R., No. 115 Sqn.

SERVICE AVIATION

Conspicuous Gallantry Medal (Flying)

Act. W/O. V. A. Roe, D.F.M., R.A.F.V.R., No. 35 Sqn.—Since the award of the Distinguished Flying Medal, W/O. Roe has participated in a further large number of operational sorties. He has proved himself to be a most enthusiastic and skilful air gunner, and has continued to operate with undiminished determination and courage. By his magnificent record of achievement and unfailing devotion to duty, this gallant warrant officer has set a sterling example to all air gunners.

Distinguished Flying Medal

Flt. Sgt. R. Barnes, R.A.F.V.R., No. 158 Sqn.
Flt. Sgt. F. J. Curtis, R.A.F.V.R., No. 158 Sqn.
Flt. Sgt. V. J. Day, R.A.F.V.R., No. 97 Sqn.
Flt. Sgt. F. E. Holbrook, R.A.F.V.R., No. 97 Sqn.
Flt. Sgt. (now P/O.) T. P. McDonagh, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. D. D. Adam, R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. J. Allen, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. R. J. Arthur, R.A.F.V.R., No. 90 Sqn.
Flt. Sgt. H. R. Banner, R.A.F.V.R., No. 7 Sqn.
Flt. Sgt. F. Barrett, R.A.F.V.R., No. 90 Sqn.
Flt. Sgt. S. Blair, R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. J. E Blyth R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. L. A Booth, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. P. C. Branson, R.A.F.V.R., No. 199 Sqn.
Flt. Sgt. K. W. Brudenell, R.A.F.V.R., No. 83 Sqn.
Flt. Sgt. J. Burgess, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. (now P/O.) J. C. Burns, R.A.F.V.R., No. 106 Sqn.
Flt. Sgt. R. F Bush, R.A.F.V.R., No. 90 Sqn.
Flt. Sgt. E. H. A. Cantwell, R.A.F.V.R., No. 101 Sqn.
Flt. Sgt. R. R. Cordell, R.A.F.V.R., No. 571 Sqn.
Flt. Sgt. E. D. P. Dagger, R.A.F.V.R., No. 582 Sqn.
Flt. Sgt. F. Eplett, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. F. G. Fisher, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. E. F. Freake, R.A.F.V.R., No. 635 Sqn.
Flt. Sgt. F. Frisk, R.A.F.V.R., No. 90 Sqn.
Flt. Sgt. J. McC. Gilmour, R.A.F.V.R., No. 314 Sqn.
Flt. Sgt. J. Hayes, R.A.F.V.A., No. 7 Sqn.
Flt. Sgt. W. H. Hitchcock, R.A.F.V.R., No. 635 Sqn.

Roll of Honour

Casualty Communiqué No. 508.

THE Air Ministry regrets to announce the following casualties on various dates. The next-of-kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of these 201 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

Killed in Action.—Sgt. G. A. T. Boyson; F/O. J. I. Coad; Sgt. T. T. Dobson; Flt. Lt. P. P. Dodson; Sgt. T. R. Dunne; Sgt. J. C. Dunville; Sgt. E. Forster; Flt. Sgt. H. B. Hodder; Sgt. W. McLean; P/O. A. Martin; Sgt. R. H. Owen; Sgt. J. M. Shields; Sgt. W. E. Sims; Flt. Sgt. T. H. Summers; Flt. Sgt. K. Surman.

Previously Reported Missing, Believed Killed in Action, Now Presumed Killed in Action.—Sgt. A. Cameron; F/O. D. F. MacDonald; Flt. Sgt. W. R. Wiseman.

Previously Reported Missing, Now Presumed Killed in Action.—Sgt. W. J. Anstey; Sgt. K. A. Archer; Sgt. D. Austin; Sgt. E. Auty; Sgt. A. R. Bailey; Sgt. E. B. Blair; Sgt. W. L. Bradley; F/O. I. MacK. Briscoe; Sgt. G. McN. Campbell; Sgt. F. Clarkson; Sgt. K. Clough; Flt. Lt. A. J. Cook; P/O. C. H. Cotton-Minchin; Sgt. K. L. Cragg; Flt. Sgt. H. T. Croft; Sgt. F. W. Daplyn; Sgt. J. Dunkley; Flt. Sgt. T. W. Edwards; Sgt. J. F. Etheridge; Sgt. S. R. G. Gardiner; Sgt. T. Gettings; F/O. C. W. G. Graham; Sgt. A. C. Grems; Flt. Sgt. N. Hall; Sgt. E. W. Hamilton; Sgt. R. N. Harper; Sgt. A. R. Hodson; F/O. F. S. Langston; Sgt. H. E. Lees; Sgt. F. R. Lewis; Sgt. J. T. Loveland; P/O. P. H. J. Mackie; Sgt. R. V. Mercer; P/O. J. I. Miller; W/O. W. E. Mitton; F/O. J. L. Munby, D.F.C.; Sgt. J. J. Murphy; Sgt. F. G. F. Osborne; Sgt. V. D. Payne; Sgt. G. D. Phoenix; Sgt. M. K. Piper; Sgt. H. W. Pound; Sgt. W. S. Purdie; Sgt. D. E. Robbins; Sgt. T. E. Roe; Flt. Sgt. R. N. Ross; Sgt. J. N. Schofield; Sgt. F. G. Shields; Sgt. J. Smollan; F/O. A. Stevens; Flt. Sgt. B. A. Stratton; F/O. R. D. Sullivan; Sgt. K. L. Summerscale; Sgt. H. Thomas; P/O. R. Timperley; P/O. E. Travers-Clarke; Sgt. J. R. Ward; Sgt. A. E. Watkins; Sgt. W. K. Watkins; Sgt. L. H. G. Weller; Sgt. B. G. White; Flt. Sgt. E. White; Sgt. B. G. Wiseman; Sgt. C. C. Wood; P/O. P. D. Wright.

Previously Reported Missing, Now Reported Killed in Action.—F/O. C. A. Pryor.

Wounded or Injured in Action.—Flt. Lt. W. T. G. Gabriel; Sqn. Ldr. C. L. Gotch; F/O. H. M. Stephens.

Died of Wounds or Injuries Received in Action.—Flt. Sgt. B. S. Felsenstein.

Missing, Believed Killed in Action.—W/O. R. A. Brown.

Missing.—Sgt. A. Allcock; W/O. S. R. Anderson, D.F.M.; W/O. A. R. Brooking; Sgt. J. L. Cameron; Sgt. R. P. Candy; Sgt. T. E. Carr; Sgt. L. P. Culley; F/O. G. Davies; W/O. M. Day; Sgt. W. Dean; W/O. J. Dugdale; F/O. M. Ellwood, D.F.M.; P/O. R. B. Finn; Flt. Sgt. W. J. Furniss; Sgt. J. Galloway; Flt. Sgt. L. D. Griffiths; F/O. D. L. Groom; Sgt. A. Helsby; F/O. A. K. Holvey; Sgt. R. Hoyle; Sgt. A. Kemp; F/O. A. F. McKellar; Sgt. C. F. Mangan; Flt. Sgt. A. J. Maton; Sgt. R. S. Melton; Sgt. R. J. Merrett; F/O. R. L. Middlemas, D.F.C.; Sgt. J. H. G. Milsom; Sgt. D. H. B. Norman; Flt. Sgt. W. W. Pinfold; Flt. Sgt. H. K. Radcliffe; Sgt. R. A. Reilly; Flt. Sgt. J. G. Roddis; Flt. Lt. P. Sutchall; P/O. E. G. Tilby; Flt. Sgt. W. Walter; Sgt. A. F. Whyte; Sgt. J. B. Wilson.

Missing, Believed Killed on Active Service.—Sgt. G. H. Butler; W/O. G. A. Clowes; Flt. Sgt. C. G. Grubb; Sgt. J. A. Haddow; Flt. Sgt. J. Jones; Flt. Sgt. D. O. Lane; Sgt. J. A. Woodgate.

Killed on Active Service.—Flt. Sgt. T. A. Balls; Flt. Sgt. E. C. Barton; Sgt. R. Bone; W/O. J. Butterworth; Sgt. K. C. Campin; P/O. R. L. Clark; A/C.2 E. G. Clear; Sqn. Ldr. S. L. Cockbain, D.F.C.; W/O. F. E. H. Dobson; Sgt. J. Downie; Wing Cdr. W. Dring, D.S.O., D.F.C.; Flt. Lt. L. M. G. Ferguson; Sgt. W. A. George; F/O. S. W. Goodman, D.F.M.; W/O. N. W. Harnett; Sgt. K. Harris; Flt. Sgt. E. R. Hodson; F/O. A. H. Hurst; Sgt. A. T. R. Jones; Sgt. J. P. King; Sgt. J. Littlemore; Group Capt. J. F. X. McKenna, A.F.C.; Sgt. W. R. Mallory; P/O. W. A. Marritt; F/O. F. R. Miller; F/O. R. Moyes; Sgt. N. Pasquill; Sgt. W. F. Porter; F/O. B. A. Read, D.F.C.; L.A/C. G. P. Robbins; Sgt. N. C. Swingler; Flt. Lt. E. P. J. A. Thomas; Sgt. E. E. Thurston; Flt. Sgt. R. J. Vincent; F/O. F. Waddingham; W/O. J. L. Williams; Sgt. E. J. Wilmot; Sgt. C. D. Wong.

Wounded or Injured on Active Service.—W/O. A. C. Barker; L.A/C. P. J. Barton; L.A/C. F. A. J. Dear; Flt. Sgt. E. W. Hollingsworth; Sgt. G. L. Longman, Sgt. G. L. Maycock.

Died on Active Service.—Cpl. H. N. Carter; F/O. R. MacA. Crichton; L.A/C. R. Husband; Wing Cdr. J. A. W. Lawrence; L.A/C. C. R. J. Saggs; L.A/C. W. G. McD. White; Flt. Sgt. V. A. L. Williams.

Previously Reported Missing, Now Reported Prisoner of War.—Sgt. E. F. Deadman; Flt. Sgt. A. D. Eagle; Sgt. R. L. Leverington; Sgt. J. B. Lucas; Sgt. H. K. Ormrod.

The badge of No. 692 Squadron, R.A.F. "Polus Dum Sidera Pascet" (So Long as the Sky Shall Feed the Stars).

Royal Australian Air Force

Killed in Action.—Flt. Sgt. M. Browne.

Previously Reported Missing, Believed Killed in Action, Now Reported Killed in Action.—F/O. R. H. Morgan.

Missing.—F/O. E. P. Burke; W/O. W. A. Kinloch; P/O. J. R. Mulligan; F/O. I. S. Ross.

Killed on Active Service.—Flt. Sgt. N. D. Pattinson.

Royal Canadian Air Force

Killed in Action.—F/O. D. H. Bennett; F/O. R. M. Smith; Flt. Sgt. C. Young.

Previously Reported Missing, Believed Killed in Action, Now Presumed Killed in Action.—P/O. J. L. E. Chartrand; P/O. D. J. Copeland; Sgt. L. R. Dyment; F/O. W. B. Jardine; P/O. J. M. Johnston; P/O. W. S. Jones; P/O. R. W. Lough; P/O. J. C. McNary; F/O. H. F. Morrow; F/O. W. K. Raby; Flt. Sgt. E. F. Sheehan; F/O. J. H. Wilson.

Previously Reported Missing, Now Presumed Killed in Action.—F/O. F. C. Anderson; P/O. A. R. Armitage; P/O. J. D. Bates; W/O. J. L. Beattie; P/O. W. W. Bigoray, D.F.M.; Flt. Sgt. J. F. Blair; F/O. L. F. Blakeney; P/O. L. N. Botsford; Sgt. H. F. Bottomley; Flt. Sgt. D. I. Bowden; P/O. M. Boyer; F/O. R. O. Brown; P/O. F. P. Cammaart; F/O. R. S. Campsall; Flt. Lt. D. M. Carey; P/O. D. B. Carter; Sqn. Ldr. F. E. Carter; W/O. R. Chaplin; W/O. E. M. Coulter; F/O. J. H. Cunningham; P/O. E. H. Cutler; P/O. J. E. Davidson; P/O. J. W. Donnelly; P/O. J. E. J. Dorval; Flt. Sgt. G. H. Dudley; W/O. J. C. M. Earle; Flt. Lt. G. B. Edmonds; F/O. W. L. Englert; P/O. A. C. Forsyth; P/O. A. L. Gabel; P/O. A. Gibson; Sqn. Ldr. M. W. Gibson; P/O. A. J. Gillis; P/O. L. E. Goodkey; P/O. J. A. Gover; Sgt. A. H. Hackbart; F/O. E. Hanson; P/O. G. C. Hatch; F/O. W. D. Hayter; P/O. R. E. Hazael; P/O. J. Hein; P/O. O. W. Hicks; Flt. Lt. G. A. Holland; Flt. Lt. C. D. T. Holmberg; W/O. J. C. Horne; Flt. Lt. R. B. Hunt; L.A/C. J. W. Husselbee; F/O. E. H. Hutcheson; F/O. R. J. Kee; P/O. R. G. Kelly; F/O. C. W. Kruger; Sqn. Ldr. G. J. Laird, D.F.C.; P/O. J. S. Laird; P/O. G. J. Langridge; P/O. E. A. Lansdowne; P/O. M. C. Latornell; W/O. D. G. Leask; P/O. J. W. Lethbridge; P/O. F. M. Linton; Flt. Sgt. J. Luck; P/O. D. T. Lyng; W/O. J. M. McCallum; P/O. L. M. McCann; P/O. C. J. McCarvill; P/O. J. A. MacDonald; P/O. R. MacGillivray; P/O. M. H. MacLeod; F/O. W. H. McPherson; F/O. C. A. Mayhew; Flt. Sgt. A. S. Miller; P/O. L. V. Milward; Flt. Sgt. R. E. Mogalki; W/O. A. R. Morgan; F/O. N. G. P. Munnery; P/O. R. D. Mutch; F/O. R. C. Parry; F/O. D. J. Paterson; P/O. J. W. Patrick; P/O. F. W. Peppiatt; F/O. J. R. Piper; P/O. L. T. Prosser; Flt. Sgt. F. P. M. Quinn; F/O. A. E. Reid; F/O. W. E. Rempel; P/O. J. J. Renning; F/O. D. A. Rowat; F/O. R. M. Rumble; P/O. T. M. Ryan; P/O. G. E. H. Schultz; F/O. H. M. Sherman; Sgt. P. S. Skebo; P/O. J. B. Stewart; Sgt. J. A. G. Taillon; Sgt. J. MacL. Thomlison; W/O. W. R. Tobin; P/O. R. Urban; P/O. W. F. Vornbrock; F/O. H. Webb; W/O. G. I. Williams; P/O. W. E. Woodrow.

Missing.—Flt. Lt. B. M. Adilman; F/O. M. Bernyk; Flt. Sgt. D. F. Campbell; Flt. Sgt. A. S. B. Campton; P/O. W. G. Gillissie; Flt. Sgt. M. Greenstein; W/O. M. H. Horne; F/O.

GOOD-BYE TO ALL THAT: A discharged aircraftman selects his new outfit at the civilian clothing centre at Wembley.

J. Hornoi; Flt. Lt. L. K. James; F/O. R. J. Lougheed; P/O. W. J. McArthur; Flt. Sgt. D. J. McAulay; Flt. Sgt. G. W. McClelland; F/O. T. McQuitty; F/O. F. J. Nickerson; F/O. G. H. Pool, D.F.C.; F/O. E. L. Saslove; Flt. Lt. J. A. Shetty; P/O. A. W. Staves.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—F/O. T. H. R. MacAulay.

KILLED ON ACTIVE SERVICE.—F/O. O. M. W. Clarson; Flt. Lt. D. B. Douglas; Sgt. J. R. Hillsdon; F/O. N. G. Riley.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE. NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. N. D. Campbell; P/O. G. A. A. A. Caron; Sgt. G. W. Lewis; Sgt. J. W. Nixon.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. L. A. Arner; W/O. J. J. Hughes; Flt. Sgt. A. M. Johnston; W/O. T. L. Jordan; Sgt. R. W. Pratt; W/O. G. L. Ready; W/O. E. G. Richards; W/O. L. Strickland.

WOUNDED OR INJURED ON ACTIVE SERVICE.—W/O. J. A. P. Baker.

DIED ON ACTIVE SERVICE.—Sgt. E. F. Wood.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. D. H. Skinner.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. F. C. Haglund; F/O. B. A. Hogg; F/O. G. B. Lawrence; W/O. R. K. Niederer; Flt. Sgt. M. H. Walton.

South African Air Force

MISSING.—Lt. M. H. L. Tweedie.

KILLED ON ACTIVE SERVICE.—Lt. I. B. Stretton.

Casualty Communiqué No. 509

Of the names in this list 201 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. S. R. Moncrieff.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—W/O. R. C. W. G. Baker; F/O. P. W. Ball; Sgt. G. Bennett; Flt. Sgt. G. Carter; F/O. H. W. Coles; F/O. T. R. Davies; Sqn. Ldr. P. W. Dunn; Flt. Lt. F. W. Gallacher, D.S.O.; Sgt. V. Gledhill; F/O. J. N. Grey; F/O. D. C. Lendrum; Sgt. B. S. Longhurst; Sgt. V. McKenzie; Flt. Lt. T. A. T. Meredith, D.F.C.; Sgt. J. P. Olive; Flt. Sgt. F. G. Roberts, D.F.M.; F/O. W. H. Rogers; F/O. D. C. Rooke; Flt. Sgt. J. R. Spowart; Flt. Sgt. C. D. Towse, D.F.M.; W/O. A. Witham; Flt. Lt. G. H. Wood; F/O. G. H. Wright.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. R. W. Andrews; F/O. J. A. Armour, D.F.C., D.F.M.; Sgt. D. B. Asquith; Sgt. A. K. Barlow; Sgt. G. Beal; Sgt. R. J. Becherel; F/O. A. Bennett; Sgt. R. S. Bettridge; F/O. H. F. Blackman; Sgt. J. O. Booker; F/O. H. E. Botting; Sgt. B. R. Bowditch; Flt. Lt. J. Bowen; P/O. E. F. Braddock; Flt. Sgt. M. E. Bridewell; Sgt. F. G. Brooks; F/O. D. Brown, D.F.C.; W/O. R. W. Brown; Sgt. T. A. Brown; F/O. A. F. Bryce; Flt. Sgt. W. C. Bull; Sgt. J. H. Butler; P/O. G. Cable, D.F.M.; Sgt. J. Cairns; Flt. Sgt. L. C. 'Casper'; Sgt. A. F. Challinor; Sgt. J. M. Charlier; F/O. W. G. Clark; Sgt. H. J. Clarke; Sgt. F. Coffey; F/O. J. B. Colthurst, Sgt. H. Cook; P/O. G. J. Denson; Sgt. H. C. Dixey; Sgt. N. Docherty; Sgt. J. Dove; P/O. A. F. Dowding; W/O. J. Dunlop; Sgt. C. Duthoit; P/O. S. A. Edwards; Sgt. G. S. Ellis; P/O. C. Elton; Sgt. D. C. Everett; Sgt. F. J. Everitt; Sgt. G. F. A. E. J. Falck; Sgt. J. T. Fenton; Flt. Sgt. P. J. H. Ferguson; F/O. T. B. Field; Sgt. E. A. Finch; Sgt. P. D. Fry; Sgt. E. Fullerton; Sgt. B. R. Garfield; Flt. Sgt. R. S. Garrod; F/O. R. L. Gibson; P/O. J. W. Golightly; Flt. Sgt. H. Grant; F/O. A. Greenwood; Sgt. G. Hadfield; Sgt. R. P. Harris; Flt. Sgt. T. Harris; Flt. Sgt. R. Heap; F/O. A. A. Henry; W/O. W. M. Hepworth; Sgt. W. J. Heward; Sgt. E. R. Hill; Flt. Sgt. G. J. Hill; Sgt. A. Hodgson; Sgt. J. A. Holder; Flt. Lt. J. C. Hornby; Sgt. C. Howes; Sqn. Ldr. C. H. Hunter; Sgt. W. Impey; Sgt. S. H. Jenkins; Sgt. R. A. Johnson; P/O. G. D. Jones; Sgt. D. King; Sgt. M. Latham; Sgt. S. Lee; Sgt. R. G. Lovegrove; F/O. B. P. McGonagle, D.F.C.; Sgt. J. McIver; P/O. I. F. H. McKenna; Flt. Sgt. K. J. Macey; Sgt. J. Marshall; Flt. Sgt. C. H. Maxted; Sgt. L. E. Mears; Sgt. J. Mellor; P/O. G. R. Miles; Sgt. K. Morley; Sgt. E. L. Morton; Sgt. C. A. Nash; Sgt. W. Neil; Sgt. H. J. Newey; Sgt. H. J. Norman; Sgt. H. C. Parker; Flt. Sgt. J. Parker; Sgt. G. I. Paterson; Sgt. A. Pestell; Sgt. L. E. Pringle; Flt. Lt. R. H. Pugh; Sgt. R. L. Putt; Sgt. D. J. Rawlinson; Sgt. W. A. C. Reid; Sgt. G. F. Reynolds; P/O. C. W. G. Roberts; Sgt. R. A. J. Rudge; Sgt. R. G. S. Russell; Wing. Cdr. W. McF. Russell, D.F.C.; Sgt. D. H. Ryder; F/O. N. Simister, D.F.M.; Sgt. F. R. Simmons; Sgt. F. G. Skeet; Sgt. H. Snowling; Sgt. A. R. Tranter; Sgt. J. G. Turnbull; Sgt. R. Wallace; Sgt. G. Wheeler; Sgt. C. Whitelock; Flt. Sgt. A. Williams; Sgt. B. T. Williams; Sgt. J. Wilson; Sgt. G. Wood; Sgt. W. G. Wood; Sgt. R. L. Woodhouse; Flt. Sgt. B. T. Wootton-Woolley; F/O. P. H. W. Young; Sgt. E. W. Zaccheo.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. N. C. New; Sqn. Ldr. D. G. H. Pike.

PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Sgt. T. H. Caldecutt.

MISSING, BELIEVED KILLED IN ACTION.—P/O. J. F. Shirley; F/O. C. C. Smith, D.F.C.

MISSING.—Sqn. Ldr. C. V. Bennett, D.F.C.; Flt. Sgt. R. W. Bentley; Flt. Sgt. J. A. R. Bertlin; Sgt. J. F. Brady; Sgt. J. A. Christie; Sgt. H. H. Collins; P/O. R. H. Cousens; Flt. Sgt. H. Croucher; Sgt. G. Dacey; Sqn. Ldr. R. M. Dagnail; P/O. J. Daly; F/O. R. A. W. Evans; Flt. Sgt. G. Flaxman; Sgt. V. M. B. Halls; Sgt. D. B. M. Hodges; Flt. Sgt. T. M. Laurie; Sgt. E. Leather; F/O. L. Linhart; P/O. S. H. Moore; P/O. F. J. Nicholson; P/O. G. B. Noonan; F/O. T. Osler; Flt. Sgt. G. A. Pope; F/O. K. Potts, D.F.C.; Sgt. L. O. Precieux; Flt. Sgt. N. G. Prescott; Sgt. R. Rickeard; Flt. Sgt. G. A. Scott; Flt. Sgt. H. B. Sharp; Sgt. A. L. Smith; P/O. J. D. Smith; Flt. Lt. R. A. Smith; F/O. R. H. Stenning; Sgt. P. Stimpson; F/O. B. H. Stockley; F/O. A. Tittle; Sgt. J. T. Tunstall; Sgt. J. K. Walker; P/O. E. A. Wass; F/O. T. Wood.

KILLED ON ACTIVE SERVICE.—Sqn. Ldr. H. Beattie; L.A/C. W. J. W. Canning; Flt. Lt. R. W. Hall; W/O. F. B. Kershaw; F/O. G. R. O. Langton; Flt. Lt. B. Moores; Flt. Lt. A. R. Quinn; Flt. Sgt. D. O. Wheatley; F/O. T. U. Williamson; Sgt. L. R. Woods.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. A. H. G. Biggs; Sgt. A. C. Connor; Sgt. D. W. D. Greenop; Flt. Lt. H. S. L. Underwood.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. J. Newlands.

DIED ON ACTIVE SERVICE.—Cpl. H. C. Johnston; L.A/C. W. Morris; Sgt. F. Pearson; L.A/C. G. F. Sanderson; Flt. Lt. A. Sharples; L.A/C. F. J. Sparks.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. R. Hancock; Flt. Sgt. L. J. Lucas; Flt. Lt. C. W. Nuttall; Flt. Sgt. W. S. Sharratt; F/O. R. J. Taylor; Flt. Sgt. J. D. Ward.

HOME AGAIN! Returned prisoners of war leaving the Lancaster which brought them from Germany to England.

The badge of No. 193 Squadron, R.A.F. "Aera et Terram Imperare" (To Govern the Air and the Earth).

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.1 E. M. Grosert; A/CW. M. Lowe.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—W/O. A. A. Braid; P/O. A. I. Crain.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—W/O. W. W. Beavan; W/O. J. E. Browne; Flt. Lt. A. W. Dowsett; Flt. Sgt. P. K. R. Gericke; W/O. V. A. M. Hedges, D.F.C.; Flt. Sgt. W. G. Hogg; Flt. Sgt. B. A. Hough; P/O. S. E. James; P/O. G. J. Kerr; Flt. Sgt. D. B. Larkins; P/O. S. W. Lawson; F/O. R. B. McDougal; P/O. G. L. Messenger; Flt. Sgt. W. J. Moody; P/O. K. C. Page; Flt. Sgt. A. H. Palfreyman; Flt. Sgt. V. H. Pearsall; F/O. A. H. Probert; F/O. K. F. Ryan; Flt. Sgt. M. E. Sadler; Flt. Sgt. W. A. Sampey; Flt. Sgt. R. C. Strange.

MISSING.—Flt. Sgt. L. T. Dwyer; Flt. Lt. N. G. Gilmour; Flt. Sgt. W. W. Harris.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. M. J. Fairclough; Flt. Sgt. L. K. Whellum.

Royal Canadian Air Force

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. C. N. Aune; F/O. L. J. Benville; Flt. Sgt. H. A. Dunphy; F/O. F. T. Leithead; Flt. Sgt. C. H. McInnes; F/O. E. Rhind; Flt. Sgt. J. A. Rinder; Flt. Lt. J. E. Sales; P/O. B. G. Simonin; Flt. Sgt. E. L. Stevens.

MISSING.—F/O. J. Allan; Flt. Sgt. F. W. Bradley; Flt. Sgt. D. H. Brown; Flt. Sgt. F. N. Brown; P/O. J. T. R. Caughy; F/O. J. H. Clark; F/O. C. J. Clarke; Flt. Sgt. J. T. Clarke; F/O. A. L. Coldwell; Sqn. Ldr. B. G. Crew; Flt. Sgt. G. Durnan; Flt. Sgt. V. D. Elliott; Flt. Sgt. T. A. Gabriel; Flt. Sgt. L. A. J. Gauthier; Flt. Lt. H. S. Glassco; Flt. Sgt. J. Gyrame; F/O. R. D. K. Hanbidge; P/O. G. Hay; F/O. G. A. Humberstone; W/O. D. R. Hutchins; P/O. K. R. Joslin; F/O. C. Kelway; Flt. Sgt. J. Y. J. C. Lamarre; Flt. Sgt. J. G. MacKay; F/O. K. J. McLean; Flt. Sgt. H. E. Miell; F/O. M. A. Mills; P/O. J. A. F. Piche; Sgt. R. A. Quinn; Flt. Sgt. W. J. Rahkola; F/O. A. J. Reeder; F/O. J. L. M. R. Savard; Flt. Lt. A. F. Scheelar; P/O. N. L. W. Scott; F/O. W. Y. J. Soper; Flt. Lt. L. G. Sparling; F/O. L. W. Splatt; F/O. K. A. Stroh; F/O. J. P. H. Terreau; F/O. K. J. Thomson; W/O. J. J. M. Tremblay; Flt. Sgt. D. Veri; Flt. Sgt. A. E. Wells.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. W. R. Gibson; P/O. L. F. Head; F/O. J. E. Prudham; F/O. J. A. Smith; F/O. E. G. Shepherd; F/O. C. E. Willis.

Royal New Zealand Air Force

KILLED IN ACTION.—W/O. J. S. Horan; Flt. Lt. A. B. Stead.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. L. N. Couchman; F/O. R. E. Leigh; Flt. Lt. J. B. Smith, D.F.C.; P/O. A. G. Stafford; P/O. R. Wood.

Casualty Communiqué No. 510

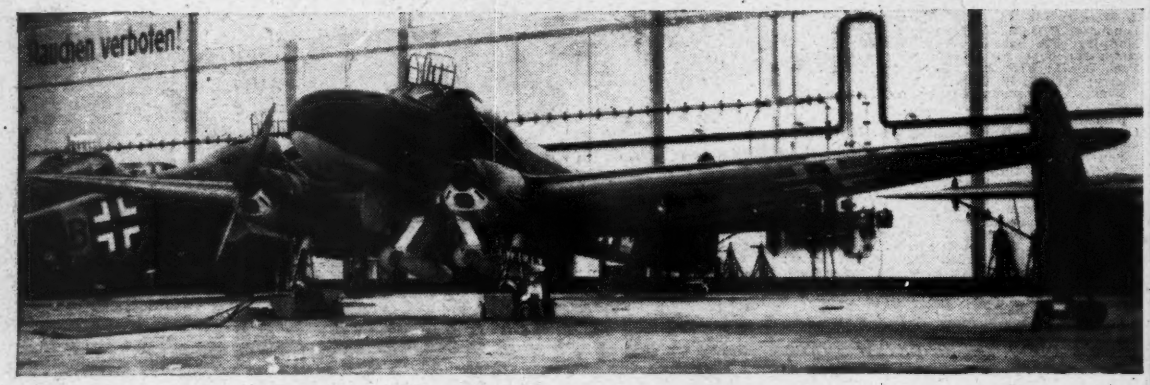
Of the names in this list 198 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—F/O. W. Brown; W/O. W. J. S. Hayward; F/O. J. Watson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. A. Beaumont; Flt. Lt. A. G. Bird, D.F.C. and Bar; P/O. R. R. Brant; Flt. Lt. C. E. Brayshaw; F/O. S. H. Cheeseman; Flt. Sgt. D. C. Dick; F/O. J. Ellyatt; Sgt. W. A. Gosnay; F/O. A. Hawker; Sgt. R. W. Kemp; Flt. Sgt. D. J. Lush; Sgt. G. A. McEwan; Wing Cdr. A. D. Phillips, D.S.O., D.F.C.; Sgt. E. R. Read; Flt. Lt. S. A. Rodgers; Sgt. A. R. Sealtiel; Sgt. A. A. Short; F/O. R. W. Thomson, D.F.C.; Sgt. H. V. J. Thorne; F/O. W. C. Vatcher; Sgt. B. R. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—W/O. E. A. Aldred;



NO MORE TRAINING: An Fw 58 found in a hangar by troops of the 11th British Armoured Division when they fought their way through Lüneburg Heath.

SERVICE AVIATION

Sgt. K. Allen; Sgt. W. E. Allen; F/O. P. L. Andrewes; Sgt. F. H. Baker; Sgt. R. R. O. Bartram; Sgt. R. L. Bates; Sgt. S. Bates; Flt. Lt. D. P. M. Bell; Sgt. G. H. Bodycot; Sgt. W. H. Botterill; Sgt. K. Bray; Sgt. A. J. Brazier; Sgt. F. J. Broad; Sgt. O. McD. Brown; F/O. K. R. Bunney; Sgt. P. G. Burgon; Sgt. A. S. Campbell; Sgt. J. Campbell; Sgt. D. B. Carlick; Sgt. C. Christie; Flt. Sgt. W. P. Clapham; Sgt. G. F. Clark; Sgt. J. P. V. Cole; Sgt. P. L. Colman; Sgt. J. P. Coogan; Sgt. D. H. Cro; Sgt. K. Cushing; P/O. P. S. W. Daniel; Flt. Sgt. R. Dawes; Sgt. W. R. Day; Sgt. R. Dent; Sgt. M. H. Duffy; Sgt. H. Dunn; Sgt. W. A. Dykes; Sgt. S. J. Eden; Sgt. C. J. Evans; Flt. Sgt. L. T. Fairclough; Flt. Sgt. J. Fenton; Sgt. T. A. Finch; Sgt. M. Fowler; Flt. Sgt. J. W. Goulbourn; Flt. Lt. H. R. Hampshire; Sgt. F. Harman; F/O. G. S. Hartley; Sgt. A. Hatfield; W/O. A. Hazelhurst; Flt. Sgt. W. J. Hollis; Sgt. E. D. Horton; P/O. G. W. Hume; F/O. R. C. Hunter; F/O. S. A. Isham; Sgt. W. Johnstone; F/O. D. G. Jones; Sgt. N. O. Jones; Flt. Lt. R. V. Jones; Sgt. D. W. Kennedy; P/O. J. S. Kirton; Sgt. P. Latchford; Sgt. K. Linford; P/O. W. G. K. McLaren; Sgt. C. McLean; Wing Cdr. R. E. X. Mack, D.F.C.; Sgt. C. H. Marsh; W/O. A. A. W. Melrose; Sgt. E. R. Metcalf; Flt Sgt. A. P. Myles; Sgt. P. Newbery; F/O. A. J. Newton, D.F.M.; Sgt. H. A. Nightingale; Sgt. K. J. Nuttycombe; F/O. W. H. C. Pateman; P/O. F. L. Peck; Flt. Lt. H. H. Percy; Sgt. J. L. Powell; Sgt. J. Ratcliffe; Sgt. K. B. Reeves; Sgt. H. G. Ridd; Sgt. L. W. Roberts; Sgt. A. Rutherford-Browne; Flt. Sgt. F. Salmond; F/O. G. Salter; Flt. Sgt. R. F. Scarlett; Flt. Sgt. C. Shackleton; Sgt. W. H. Shirley; Flt. Sgt. R. A. R. Smith; Sgt. F. I. Spencer; F/O. R. Stakes; Flt. Sgt. J. F. Steward; Flt. Sgt. D. J. Stokes; Sgt. H. Stollar; P/O. R. Tandy; Flt. Sgt. C. Tattersall; Flt. Sgt F. Taylor; Flt. Lt. B. C. Townsin; P/O. C. R. E. Walton; Sgt. W. A. Webb; Sgt. I. Welch; Sgt. R. Whitaker; Sgt. S. C. Wilkins; Sgt. T. Winn; Sgt. D. J. Withers; Sgt. R. W. Wood; F/O. R. O. Wright; Flt. Sgt. C. H. L. Wright, D.F.M.; Sgt. S. T. Wright; Flt. Sgt. E. O. D. Yorke.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. J. Hesketh; P/O. E. H. Moulden; F/O. A. C. A. Greenfield; P/O. E. J. Roe.

WOUNDED OR INJURED IN ACTION.—F/O. M. P. Crampton, D.F.M.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—F/O. J. A. Hickson.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Lt. C. R. Goodwin; F/O. S. Potts.

MISSING.—Flt. Sgt. D. C. Allen; Flt. Sgt. A. H. Andrews; Flt. Lt. A. J. Bacon; Sgt. E. R. Barradell; Flt. Lt. R. G. Beuttell; Flt. Sgt. W. H. Bryan; Sgt. E. J. Burke; Sgt. A. A. Clements; P/O. G. D. Evers; Sgt. J. J. Farquhar; Sgt. E. N. J. Francis; Flt. Sgt. P. Freeman; F/O. G. C. Galloway; W/O. A. F. Goodall; Sgt. R. G. Hibbins; Flt. Sgt. E. Holland; Flt. Sgt. R. Kiddle; F/O. R. J. Lacey; Flt. Sgt. R. E. Lapworth; Flt. Sgt. R. A. Loader; Sgt. J. Mann; W/O. G. W. Mansfield; Flt. Lt. J. H. Moreton; Flt. Sgt. A. Morris; Wing Cdr. N. F. Morris; F/O. F. J. Norton; Sgt. O. Old; Flt. Lt. A. G. Richardson; F/O. P. Richardson; Sgt. J. Robertson; Flt. Sgt. W. D. Stone; Flt. Sgt. J. C. Tipper; W/O. J. Towns; F/O. E. Webb; Sgt. F. T. White; Sgt. R. J. Williams.

KILLED ON ACTIVE SERVICE.—Flt. Lt. L. A. Butcher, D.F.C.; W/O. J. L. J. Engineer; Sgt. L. G. Good; Sgt. P. F. Gronous; Sgt. J. S. Gunn; Flt. Sgt. W. P. Hamilton; A/C.2 D. Herries; Sgt. C. A. Johnstone; Cpl. E. W. Kelly; A/C.2 A. G. Knowler; P/O. C. E. Lumley; A/C.1 D. L. Nelson; L.A/C. D. A. O'Connell; Sgt. C. D. Parker; Flt. Sgt. T. J. Patrick; Flt. Lt. J. D. H. Pearson; Sgt. A. H. Pyrah; Flt. Sgt. R. J. Rothwell; Sgt J. Thompson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—L.A/C. A. E. Hunter; Flt. Sgt. F. O. Kirsopp; Flt. Sgt. D. F. H. Taylor; Flt. Lt. H. J. Wilkinson.

WOUNDED OR INJURED ON ACTIVE SERVICE.—W/O. T. Appleby; Sgt. W. P. A. Smith.

DIED ON ACTIVE SERVICE.—L.A/C. H. Barlow; L.A/C. J. M. Barry; F/O. E. W. Bigsby; Cpl. A. Buxton; W/O. F. J. B. Finnerty; Sgt. W. T. Green; F/O. J. W. R. Hill, D.F.C.; Wing Cdr. J. M. Lander, D.F.C.; Cpl. J. Looker; Air Vice Marshal R. B. Mansell, C.B., C.B.E.; A/C.1 J. A. Meek; L.A/C. H. L. Morgan; Sgt. W. G. Neilson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. L. P. Barham; Flt. Sgt. G. Bennett; Flt. Lt. T. H. Blackham, D.F.C.; F/O. S. A. Booker; Flt. Lt. K. W. Chapman; Flt. Sgt. E. J. Davis; Sgt. T. Gould; F/O. C. G. Griffin; P/O. M. A. Guilfoyle; Sgt. D. F. Jordin; Sgt. R. W. Joyce; F/O. W. Kay; Sgt. D. E. Leslie; Flt. Sgt. J. N. Osselton; Flt. Sgt. J. Robertson; F/O. F. Salt; F/O. D. A. Slack; Flt. Lt. P. G. Taylor; Sgt. G. F. Watmough; Flt. Sgt. L. Wesley.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW. B. A. Leat.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. A. J. Casey.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. S. N. Campbell; Cpl. K. Kenny; Flt. Sgt. W. McI. M. Lipscomb; L.A/C. G. G. Parkin.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. T. M. Anderson; Flt. Sgt. R. D. Anthony; F/O. D. C. Dunn; Flt. Sgt. H. M. Hewett; Flt. Sgt. S. R. Hore; F/O. J. P. Hutchinson; Flt. Sgt. A. N. Ingles; Flt. Sgt. C. B. Jeffery; Flt. Lt. W. J. H. Love; P/O. K. G. McAlpine; Flt. Sgt. V. A. McCarthy; F/O. J. W. McDonald; Flt. Sgt. G. A. McGilvray; Flt. Sgt. B. S. Richmond; Flt. Sgt. C. W. Sisley; Flt Sgt. L. J. Thyer; F/O. R. B. Tuff.

MISSING.—W/O. A. D. Anderson; W/O. E. J. Datson; P/O. G. W. Ham; Flt. Lt. W. G. Huddart; Flt. Lt. A. W. D. McLachlan; W/O. W. J. Sandercock; W/O. R. Webster.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. G. A. Boyd; Flt. Lt. J. McP. Richardson; Flt. Sgt. J. S. Robinson; Flt. Sgt A. A. White.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. E. D. Holmes; Sgt. E. J. Lever; Flt. Sgt. L. J. Stephens.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. K. A. Howard; Flt. Sgt. R. W. Perry.

AMENDMENT.

It is regretted that Flying Officer R. D. Leake was erroneously reported "Killed in Action" in the Casualty Communiqué on March 16th, 1945. His name should have appeared under the heading of "Missing."

Royal Canadian Air Force

KILLED IN ACTION.—P/O. G. H. Barnett, F/O. L. J. Berry; Flt. Lt. J. E. Donoghue; F/O. D. J. MacKinnon; Flt. Lt. W. H. McPhail; L.A/C. R. H. Prosser; Flt. Lt. J. K. Ramsay; L.A/C. K. A. Scott; W/O. E. F. Williams; P/O. J. R. Wilson.

WOUNDED OR INJURED IN ACTION.—W/O. J. S. Duncan; F/O. V. J. P. Gerald; F/O. A. L. Thomson.

MISSING.—P/O. F. E. Bentley; W/O. H. A. Carruthers; F/O. H. D. Christie; Flt. Sgt. D. C. Cockwill; F/O. G. R. R. H. Craib; Flt. Sgt. F. W. Dobbs; F/O. C. Gurevitch; F/O. K. G. Gutensohn; F/O. V. H. Halstead; Flt. Sgt. C. H. Hudson; Flt. Lt. R. J. Land; Flt. Sgt. C. B. MacDonnell; Flt. Sgt. A. G. McKay; F/O. A. M. MacKie; F/O. M. A. MacLeod; Flt. Lt. D. B. MacNeil; Flt. Sgt. C. C. Merriman; F/O. T. R. Murray; Flt. Lt. D. S. Nelson; Flt. Sgt. J. S. Netzke; W/O. O. J. Rau; F/O. E. W. Rech; Flt. Sgt. H. M. Rumball; F/O. G. D. Spencer; Flt. Lt. G. O. Tedford; P/O. C. S. Thomson; F/O. N. R. Vatne; Flt. Sgt. A. M. O. Walker.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. L. A. Chauvin; F/O. N. Chobaniuk; F/O. R. J. Dubeau; F/O. J. R. R. Gingras; Sgt. K. M. Hillis; Sgt. J. W. McMurdo; W/O. J. J. M. Simard; F/O. J. W. R. Walsh.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Flt. Sgt. O. R. Custeau.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. H. Atkin; W/O. D. Clark; W/O. G. A. E. Compton; Flt. Sgt. F. H. Fulsher; F/O. J. D. Harvie F/O. S. G. Hetherington; P/O. D. High; F/O. T. R. Hodgson; Flt. Lt. C. R. Hoffman; F/O. P. Scullion; P/O. J. Sonshine; F/O. E. C. Watson.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. J. L. Lockhead.

KILLED ON ACTIVE SERVICE.—F/O. D. C. Holland; F/O. F. W. Ritchie; F/O. R. P. Woolfield.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. M. F. Cullen; Sqn. Ldr. P. J. Lamason, D.F.C. and Bar.

South African Air Force

KILLED IN ACTION.—Lt. W. J. Dodd; Lt. A. W. Peterson; Lt. R. R. Truter.

MISSING, BELIEVED KILLED IN ACTION.—2nd Lt. C. B. Susskind.

MISSING.—Flt. Lt. G. M. Henderson; Capt. W. R. Roberts.

WOUNDED OR INJURED ON ACTIVE SERVICE.—2nd Lt. A. L. Pons.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—W/O. M. Zerif.

Official Corrections

Casualty Communiqué No. 500.

Under "MISSING, BELIEVED KILLED IN ACTION," delete W/O. W. H. A. Lye.

Uner "MISSING," delete Sgt. J. Brownbridge, W/O. N. C. Churchill, Flt. Lt. S. B. H. Harrison, F/O. J. A. Patterson, P/O. R. W. Pollinger, Flt. Sgt. C. Williams.

Under R.A.A.F. "MISSING," delete W/O. D. Royds.

Casualty Communiqué No. 501.

Under "KILLED IN ACTION," Sgt. L. J. Bull should read Flt. Sgt. L. J. Insert F/O. H. Ross.

Under "PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION," P/O. A. Ghaulk should read Chaulk.

Under "MISSING," delete P/O. E. M. Boorman, Flt. Lt. G. N. Chandler, F/O. H. Ross and Sgt. V. Welbourne.

Under "PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR," Sgt. G. G. P. Hine should read Flt. Sgt. G. G. P.

Under R.C.A.F. "KILLED IN ACTION," Flt. Sgt. G. Warren should read P/O. G., and insert F/O. D. Woolf.

Under R.C.A.F. "MISSING," delete Flt. Sgt. K. M. Mason.

Casualty Communiqué No. 502.

Under "MISSING, BELIEVED KILLED IN ACTION," delete Sgt. P. A. Lake.

Under "MISSING" delete Flt. Sgt. J. H. D. Bax, Sgt. R. A. Bromley, Flt. Sgt. J. W. Emms, Flt. Sgt. A. R. Hall, Flt. Sgt. M. E. F. Haslam; Flt. Lt. I. B. Hayes, Flt. Lt. J. T. Jones, Flt. Lt. J. N. Steel, Flt. Sgt. J. C. Tear; Sgt. E. Timms, W/O. R. B. Warner; Sgt. G. R. Wilding.

Under "PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR," delete Flt. Sgt. F. A. Giles.

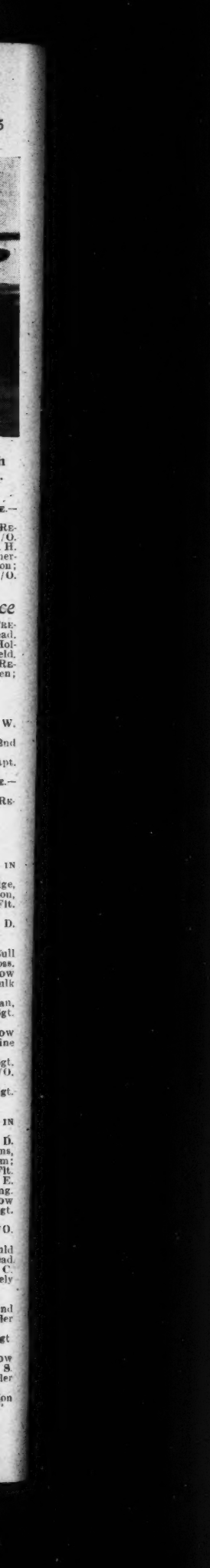
Under R.A.A.F. "MISSING," delete F/O. H. E. D. Figgis.

Under "MISSING," W/O. S. A. Church should read P/O. Flt. Sgt. T. J. Maloney should read P/O. Delete W/O. R. G. Rogers, Flt. Sgt. H. C. Tarzwell should read P/O. W/O. L. P. Wakely should read P/O.

Casualty Communiqué No. 503.

Under "MISSING," F/O. J. G. Faracher and Flt. Lt. R. Mackenzie should be inserted under "KILLED IN ACTION."

Under "KILLED ON ACTIVE SERVICE," Sgt H. J. Williams should read Flt. Sgt.

Under "PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR," Sgt. W. J. S. Ballard should read Flt. Sgt.; Sgt. I. L. Horler should read Flt. Sgt.

Under R.C.A.F. "MISSING," P/O. C. D. Mison should be inserted under "KILLED IN ACTION."